EPA WORK ASSIGNMENT NUMBER: 158-2LR6
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EBASCO SERVICES INCORPORATED

Appendix I Administrative Order on Consent
Index Number II CERCLA - 80206

FINAL WORK PLAN FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY TRONIC PLATING COMPANY SITE FARMINGDALE, NEW YORK

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EXECUTIVE SUMMARY

The Tronic Plating Company Site is ranked 253 on the National Priorities List. The site is located in Farmingdale, Suffolk County, New York in a commerical and industrial area. Plating wastes were discharged by the facility into on-site leaching pits from 1968 to 1984. Between 1979 and 1982, the Suffolk County Department of Health Services (SCDHS) detected copper, silver, iron, zinc, lead, cadmium and cyanide in the leaching and sanitary pits at the site. In 1984, the Tronic Plating Company moved its operations to another location.

Ebasco's approach to the Remedial Investigation/Feasibility Study of the Tronic Plating Comany Site consists of the preparation of a Field Operations Plan which describes a site investigation, and the evaluation of remedial alternatives, and a Community Relations Program. A two-phased approach will be used for data collection. Phase I will consist of an initial site investigation to determine the nature and extent of the problem. Nine wells, including two off-site, will be installed in Phase I. Groundwater, soil, and surface water runoff will be collected and analyzed. Phase II, if required, is expected to be an expansion of the hydrogeological investigation to determine the extent of plating waste-related contamination off-site and to evaluate remedial alternatives for the contaminant plume downgradient of the site. However, the need for and the scope of the Phase II effort will be determined after the results of Phase I are evaluated. Computerized groundwater simulation model(s) will be used to assist in scoping the Phase II effort.

1.0 INTRODUCTION

Ebasco Services Incorporated (Ebasco) submits this Work Plan to the U.S. Environmental Protection Agency (EPA) in response to Work Assignment Number 158-2LR6 of July 10, 1987, under Contract Number 68-01-7250. This Work Plan was prepared pursuant to Ebasco's Work Plan Memorandum dated August 12, 1987.

This Work Plan presents Ebasco's technical scope of work as well as our estimated level of effort and schedule for performing a Remedial Investigation and Feasibility Study (RI/FS) for the Tronic Plating Company site, which is located in Farmingdale, New York. The RI/FS will include an evaluation of lateral and vertical extent of on-site contamination and an identification and evaluation of potential remedial alternatives.

1.1 PROJECT APPROACH

The RI/FS will be conducted in phases. The purpose of the phased approach is to determine during Phase I of the program whether or not a problem requiring corrective action exists at the site. These data will be used for the efficient planning of subsequent phases, if needed, to provide information required for the evaluation of potential remedial actions for the site. The Phase I RI will determine if additional work is required at the site, off the site, or both.

Phase I, addressed in this Work Plan, will characterize the contamination in the vicinity of the former plating waste leaching pits, determine the nature and extent of soil and groundwater contamination at the site and evaluate remedial alternatives for the site. At the conclusion of Phase I, Ebasco will recommend to EPA whether or not to pursue Phase II. If requested by EPA the Phase II RI scope-of-work would prepared by Ebasco and would be based on Phase I results. The Phase II off-site RI effort, if required, is envisioned to be a broad hydrogeologic investigation to determine the extent of groundwater contamination due to past disposal practices at the site.

The Phase I RI will be conducted to determine the in situ vertical and lateral extent of contamination, groundwater flow direction and to identify indicator compounds. A list of the indicator compounds will be generated from the Rl results which will be used to track the plating-related contaminants in the groundwater downgradient of the site during Phase II, if conducted. This phased approach has been selected because it is cost-effective and each phase is planned based on the results of the previous phase.

Phase II, if required, is expected to be an expansion of the hydrogeological investigation to determine the extent of plating waste-related off-site contaminant plume in the areas downgradient of the site. However, the need for and the complete scope of the Phase II effort will be determined after the results of Phase I are evaluated. Computerized groundwater simulation model(s) will be used to assist in scoping the Phase II effort.

1.2 PROJECT PLANNING

Ebasco's approach to preparing this RI/FS Work Plan was based upon review and consideration of the following key documents and/or factors concerning the Tronic Plating site:

- o The Phase I Preliminary Investigation Final Report on the Tronic Plating Company, Inc. site, prepared by Woodward-Clyde Consultants, Inc., September 20, 1984;
- o New York State Department of Environmental Conservation (NYSDEC) file on Tronic Plating Company, Inc., as transmitted to EPA on June 9, 1987, and
- o The Tronic Plating Company, Inc. Responsible Party Search Final Site Report, prepared by PRC Engineering, Chicago, January 1987.

In addition, Ebasco also performed a site inspection on August 3, 1987 and participated in a scoping meeting with EPA on September 15, 1987.

This Work Plan was prepared in accordance with the June 1985 "EPA Guidance on Remedial Investigations under CERCLA", the June 1985 "EPA Guidance on Feasibility Studies under CERCLA", the "Superfund Amendment and Reauthorization Act" requirements (particularly as related to remedial alternatives and ARARs), Porter's December 1986 memorandum on "Interim Guidance on Superfund Selection of Remedy", and the March 1987 "EPA Guidance on Data Quality Objectives for the RI/FS Process."

This Work Plan contains six sections in addition to this introduction. Specifically, Section 2.0 summarizes the existing data on the Tronic Plating site; Section 3.0 describes the scoping process for the planned RI/FS; Section 4.0 presents details of the RI tasks; Section 5.0 presents the FS Task Plan; and Section 6.0 discusses the Community Relations Task Plan. Section 7.0 summarizes the project management approach, including estimates of project LOE, ODC and the projected schedule. The LOE and ODC estimates and target schedule have been provided for all activities up to completion of the RI/FS. The LOE and ODC for treatability studies will be prepared following acquisition of necessary information.

2.0 SUMMARY OF EXISTING DATA

This section of the Tronic Plating site Work Plan summarizes pertinent site data from the Preliminary Investigation, analytical results of site sampling performed by the Suffolk County Department of Health Services (SCDHS) as well as information obtained from NYSDEC. For the purpose of this Work Plan, the site consists of that property occupied by 164, 166 and 168 Central Avenue, Farmingdale, New York, as described below.

2.1 SITE LOCATION, CURRENT CONDITIONS AND SITE HISTORY

2.1.1 Site Location

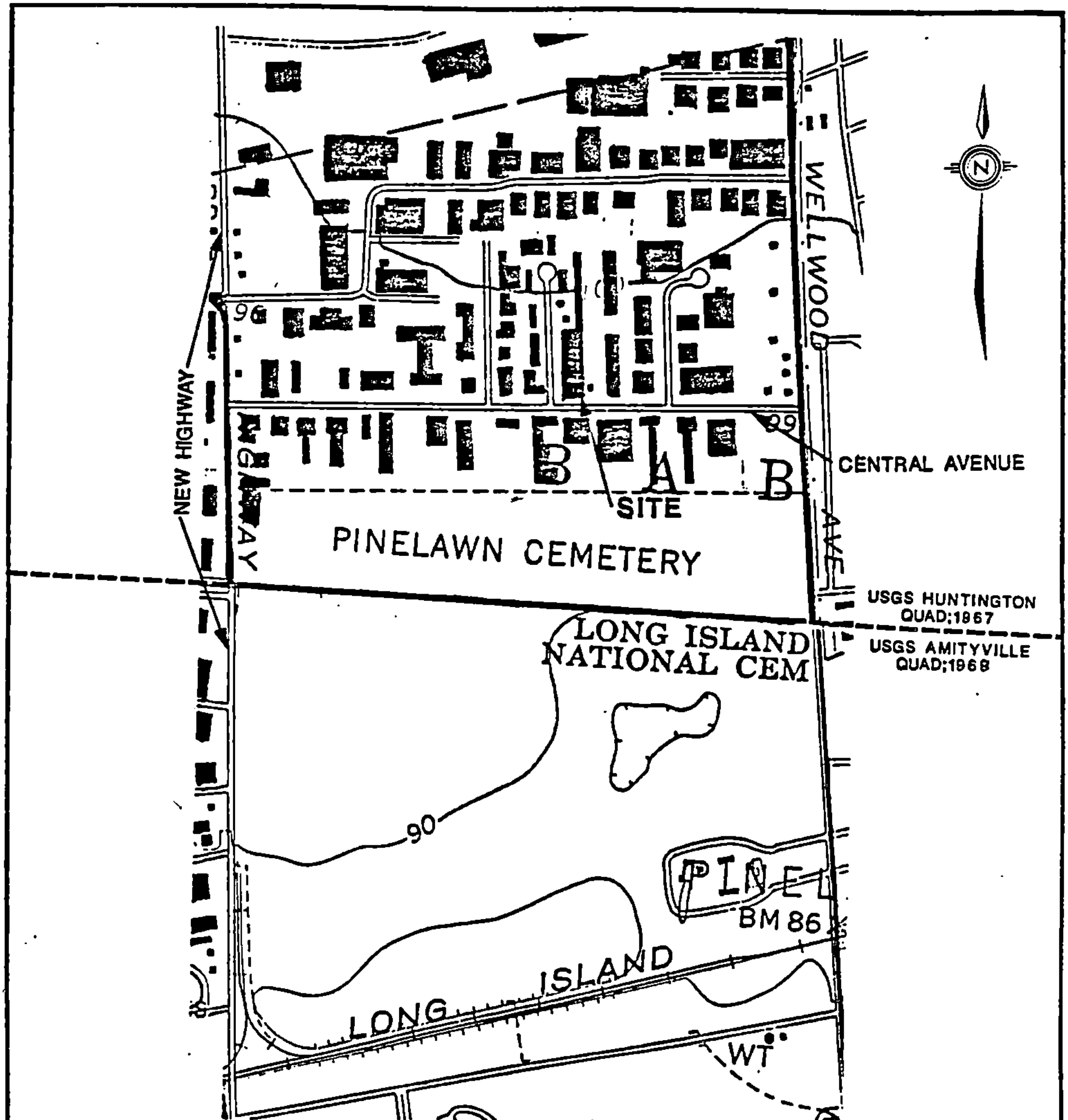
The Tronic Plating site (latitude 40° 45' 12.42"N, longitude 73° 24' 29.46"W) is located at 164-168 Central Avenue in Farmingdale, Township of Babylon, Suffolk County, New York. Figures 2-1 and 2-2 present regional and detailed site location maps for the site.

Tronic Plating site occupies approximately 0.5 acres of a 2.68 acre lot (building, lawn and paving) in southwestern Suffolk County, approximately 1.5 miles east of the Nassau County line. The Tronic Plating Company formerly occupied the southeast portion of a long building in an industrial park. Tronic provided electroplating and anodizing services to the electronics industry and occupied the site from March, 1968 to 1984.

The north-south building located on Commerce Drive is contiguous with the structure located at 162-168 Central Avenue, and is approximately 800 ft long by 50 ft wide. Table 2-1 identifies the street number and occupant at most of the addresses on Commerce Drive. Street numbers on Commerce Drive begin at "4", run south to north, and terminate at "68".

The site is a generally flat area with an average slope of less than 3 percent to the south-southeast. There are no surface water bodies near the site. The surrounding area is paved except for a grassed area (50' x 75'), with its longest dimension in an east-west direction. Precipitation run-off flows to existing storm drains on the property. The site is surrounded by light industrial facilities to the north, west and northeast and by large cemeteries to the south and southeast.

Wells provide drinking water and industrial secondary water (fire, irrigation, process water) to approximately 16,000 people in the immediate area. Local aquifers are totally dependent on precipitation runoff for recharge.



SCALE 1:10,000

1/2 — 0 MILE

1000 — 0 — 1000 FEET

.5 — 0 KILOMETER

U.S. ENVIRONMENTAL PROTECTION AGENCY

TRONIC PLATING SITE

FIGURE 2-1
TRONIC PLATING SITE LOCATION MAP
FARMINGDALE TOWN OF BABYLON
LONG ISLAND, NEW YORK

EBASCO SERVICES INCORPORATED

FIGURE 2-2
TRONIC PLATING SITE MAP

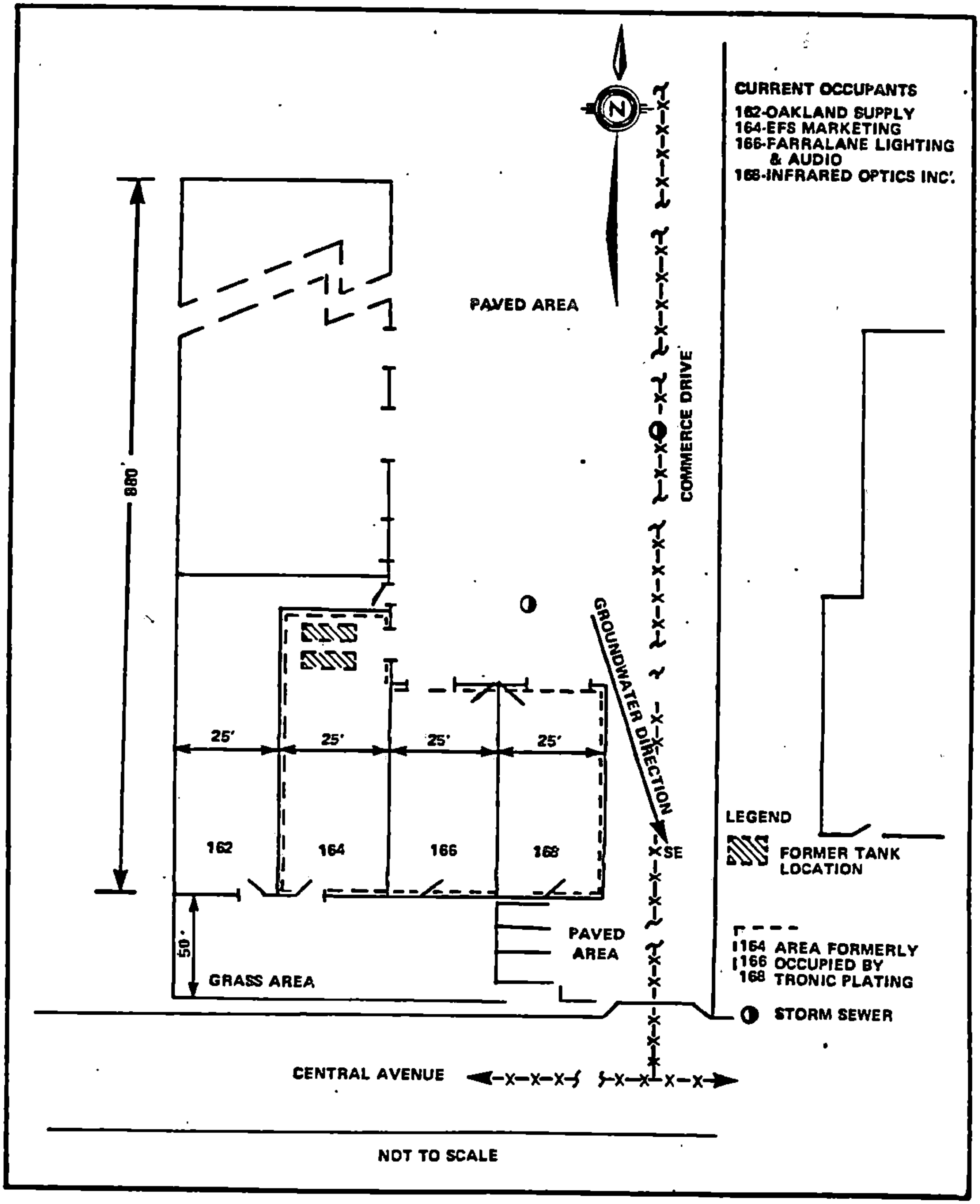


TABLE 2-1

OCCUPANTS OF COMMERCE DRIVE

STREET NO.	OCCUPANT NAME
4	Unknown
6	Carr Met Ind Inc./ IAM Sheet Metal Inc.
8	Diamond Fasteners Inc.
10	Regal Insulation Corp.
12	Trebor Instrument
16	All Seasons Air Conditioning
18	Set III Dental Studio
20	A&S Precision Specialists
22	Certified Copy Co.
24	Unknown
26	D&R Computer
28	He-Os Optical Corp.
30	Pritchard Services (NY) Inc.
32	Unknown
34	Unknown
36	Unknown
38	Master Porcelain Studio
40	Unknown
42	JESCO Inc.
44	Unknown
46	Landmark Sheet Metal Co.
48	Dabco Machine
50	Inner Circle Dental Inc.
52	Satellite Neon Corp.
54	Yours International
56	Sapenoff Machine Co.
58	Print-Tek

TABLE 2-1 (Cont'd)

OCCUPANTS OF COMMERCE DRIVE

STREET NO.	OCCUPANT NAME
60	P.D. Photographers Ltd.
62	Afford-A-Scan
64	C.W. Urbach Co.
66	Modafine
68	Joseph Roberts Co., Inc.

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2.1.2 Current Conditions

The locatión of current site occupants are depicted in Figure 2-2. Activities of the tenants are as follows:

162 Oakland Supply - supplier of industrial abrasives and tools;

164 EFS Marketing - supplier of novelty items;

166 Farralane Lighting and Audio - audio and lighting equipment, and

168 Infrared Optics, Incorporated - lens manufacturers.

Exterior conditions at the Tronics Plating site, with the exception of plating activity, are similar to those extant at the time of the plating company's tenancy. Although exact location (Fig 2-2) of sanitary (1) and leaching (4) pits outside the plant have not been determined, preliminary site reconnaissance and reference documentation have reduced the sphere of activity to a relatively limited area. Storm drains on the property, allegedly utilized for disposal of potentially hazardous effluent, are located 33 ft to 40 ft from the northern rear door of the former plating operation.

The interior conditions at 164-168 Central Avenue have changed with the exit of the plating concern in March of 1984. Fragmentary information indicates that during the tenancy of Tronic Plating Company, certain tanks and fixtures were added, moved or removed. A tentative list of those tanks and fixtures is as follows:

a) two 4,000 gallon holding tanks located at the northwestern corner of Tronic Plating (now 164 Central Ave)

b) a below grade sump pit/tank (capacity and location unknown) somewhere in the area presently occupied by the Farralane Lighting and Audio Co.

c) an array of anodizing, plating and rinsing tanks (location variable), presumably moved about to accommodate cooling water supply, discharge and plant efficiency.

d) below grade outfall piping for both sanitary and process coolant effluent (location undetermined).

e) possible floor drains (location uncertain); since March of 1984, masonry partitions have been added to accommodate the new tenants (168) Infrared Optics,

(166) Farralane Lighting and Audio Company and (164) EFS Marketing. The present owners, Commerce Holding Company, have refurbished the interior of 164-168 Central Avenue, virtually removing all trace of curbs, floor drains and mounting locations for the Tronic Plating fixtures.

2.1.3 Site History

The site history of the Tronic Plating Company and its discourse with county, state and federal agencies is summarized in Table 2-2. A comprehensive review of sampling events at the Tronic Plating site is shown in Table 2-3, referencing sampling date, location, specific analysis and organization or agency which initiated the sampling event.

2.2 SITE DESCRIPTION

2.2.1 Hydrogeology and Soils

Regional Geology

The Tronic Plating Site is situated on outwash plain deposits south of the Ronkonkoma recessional moraine. These deposits, consisting of a mixture of coarse sand and gravel, constitute the sediments of the Upper Glacial aquifer.

Figure 2-3 is a generalized geological cross-section trending north to south across Long Island which shows a southward sloping wedge of unconsolidated deposits unconformably overlying a crystalline bedrock of metamorphic and igneous rocks.

As illustrated in the diagram, three major aquifers, the Upper Glacial, the Magothy and the Lloyd sand member of the Raritan, are present beneath the site. The unconsolidated deposits are late Cretaceous, Pleistocene, and Recent in age. The total thickness of the unconsolidated deposits ranges from 750 feet to 1700 feet with maximum thickness toward the southeast.

The two aquifers of concern are the Upper Glacial and the Magothy. Previous studies have indicated that the Upper Glacial and Magothy aquifer may be hydraulically connected east and west of the site.

Upper Cretaceous Series

Raritan Formation

The Raritan formation of Late Cretaceous age is the deepest formation of unconsolidated deposits in the site area. It rest directly on the crystalline bedrock and is unconformably overlain by the Magothy formation. The Raritan formation occurs

TABLE 2-2

CHRONOLOGY OF ACTIVITIES

TRONIC PLATING COMPANY, INC

Dec 1968	Bensin and Burns engineering report to Suffolk County Department of Environmental Control for Tronic Plating Company includes sampling results from Laumon Laboratories indicating effluent exceeds of New York State waste disposal criteria.
Mar 1972	Bensin and Burns, consulting engineers for Tronic Plating Co., inform Suffolk County Department of Environmental Control of sampling of leaching pool, location undetermined.
May 1972	SCDEC correspondence to Bensin and Burns informing Tronic of necessity for proper industrial waste disposal system.
Jun 1972	SCDEC requests recent sampling results from Bensin and Burns for Tronic Plating.
Jul 1972	Meeting of SCDEC and Bensin and Burns; SCDEC requests revised engineering report.
Sep 1972	Correspondence from SCDEC to Bensin and Burns again requesting information sought at Jul 1972 meeting.
Nov 1972	Correspondence from SCDEC to Bensin and Burns as follow up to previous two requests
Nov 1972	Correspondence from J. Roth (Tronic) to Bensin and Burns accepting suggestion to install of static holding tanks.

TABLE 2-2

CHRONOLOGY OF ACTIVITIES

TRONIC PLATING COMPANY, INC

Nov 1972	Correspondence from Bensin and Burns to SCDEC replying to comments on engineering report.
Dec 1972	SCDEC requests sampling results from Bensin and Burns of Ecolotrol Lab. for November sampling.
Jul 1973	Request by SCDEC for sampling results at Tronic site.
Aug 1973	Ecolotrol sample results for Tronic received.
Aug 1973	Correspondence from SCDEC to Bensin and Burns stating Ecolotrol results at Tronic exceed New York State limits; must design treatment facility.
Nov 1973	Bensin and Burns send results of recent sampling at Tronic to SCDEC.
Jan 1974	Bensin and Burns correspondence to SCDEC questioning conflicting laboratory results between SCDEC laboratory and Ecolotrol.
Jan 1974	SCDEC informs Tronic of exceeding discharge limitations.
Feb 1974	SCDEC informs Bensin and Burns engineering report unacceptable.
May 1974	SCDEC summons Tronic Plating Co. representatives to conference to discuss discharge situation after continuous notices of violation.

TABLE 2-2
CHRONOLOGY OF ACTIVITIES
TRONIC PLATING COMPANY, INC

Jun 1974	SCDEC informs Tronic Plating through Bensin and Burns to complete SPDES permit application.
Jul 1974	NYSDEC issues Order of Consent to Tronic and informs Tronic of new New York St. minimum concentrations of Ni; Order of Consent unsigned by Tronic.
Aug 1974	Bensin and Burns delivers engineering report on waste and effluent treatment study to SCDEC; SCDEC offers recommendations to make report acceptable.
Oct 1974	SCDEC questions Bensin and Burns report on points of clarification.
Aug 1974	Seven confusing floor plans (hand drawn by Tronic representation) signed by J. Roth in compliance to state request.
Nov 1975	Bensin and Burns informs NYDEC that Tronic Plating Co. cannot afford original engineering plans and will move to a "hold and haul" disposal method.
May 1976	SCDEC requests new engineering report from Bensin and Burns dealing with Tronic "hold and haul" disposal method
Jul 1976	SCDEC disapproves engineering report by Bensin and Burns because piping locations are inaccurate and insufficient treatment of holding effluents.

TABLE 2-2
CHRONOLOGY OF ACTIVITIES
TRONIC PLATING COMPANY, INC

Nov 1976	NYSDEC site inspection of Tronic Plating facility.
Dec 1976	SCDEC informs Tronic Plating that cesspools have not been pumped and drained of contaminanted materials or filled in as requested during 3/76 NYDEC conference.
Mar 1980	NYSDEC issues Order of Consent; never signed.
Apr 1980	SPDES discharge permit granted; special monitoring requirements - pH monthly grab - submit engineering report outlining procedures for noncompliance discharge due by July 1980.
Jun 1980	NYSDEC reissues Order of Consent; not signed, accompanied by copy of $500 check from Tronic Plating to NYSDEC for fines.
Jul 1983	USEPA Potential Hazardous Waste Site inspection undertaken off-site (because Tronic refuses admittence) by Woodward and Clyde Consultants.
Dec 1983	Order of Consent #IW83-75 issued to Tronic Plating by SCDHS, Enforcement Services
Mar 1984	Tronic Plating Co. moves to Farmingdale in Nassau County, New York.

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TABLE 2-2
CHRONOLOGY OF ACTIVITIES
TRONIC PLATING COMPANY, INC

Sep 1984	Preliminary Investigation - Final Report on Tronic Plating Co., INC. site, submitted to Division of Solid Waste, NYSDEC by Woodward-Clyde Consultants.
Mar 1985	Correspondence from USEPA to New York State Clearinghouse, Division of Budget notifying the State of New York of proposed CERCLA status of Tronic Plating.
Mar 1986	NYSDEC issues Order of Consent, unsigned.
May 1986	Correspondence from State Clearinghouse, NYS Division of Budget, stating Federal funding application has been reviewed.
Sep 1986	NYSDEC issues Order of Consent, unsigned.

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TABLE 2-3

CONTAMINANT CONCENTRATIONS AT TRONIC PLATING COMPANY

NYS CRITERIA / DATE	CN 0.4	Ni 2.0	Cd 0.02	Tot.Cr 2.0	Cr^{+6} 0.1	pH 6.5–8.5	Cu 0.4	Fe 0.6	Pb 0.1	N 10.0	Ag 0.1	Zn 0.6	SAMPLING LOCATION	SAMPLING ORGANIZATION
						CONCENTRATIONS IN PPM								
1972														
Dec 4	1.1	6.6	0.85	0.25	0.01	5.4	3.85	1.7	0.5		0.18	0.5	Not indicated (N/I)	Not indicated (N/I)
1973														
Aug 9	7.4					6.6					0.42			
Nov 28		12.5	5.0	3.8			7.0	32	0.3			0.7	N/I	Suffolk Co. Dept Env. Control (SCDEC)
Dec 10	13.4													
1974														
Jan 28	6.0	1.6	3.14	0.94		6.85	2.25	0.9	0.21		0.33	0.7	N/I	Ecolotrol
Feb 11	2.5	3.0		0.13		4.6	1.8	0.3	0.1		0.05	0.2	N/I	N/I
Mar 23		1.1	1.9	1.0		7.8	1.4	2.6	0.2		0.15	0.3		
1975														
Nov 7		6.8	3.4	1.3	ND	6.9	14.0	4.0	ND	7.1	0.7	1.1	N/I	Tronic
13		3.8	3.7	1.5	ND	7.6	9.7	6.9	ND	2.5	0.8	1.4	N/I	Tronic
21	5.5	0.3	2.1	0.7	ND	6.6	3.0	4.2	ND	3.5	0.3	0.9	N/I	Tronic
26	12.8	6.9	6.8	4.1	ND	7.2	17.4	10.6	ND	1.5	0.1	0.52	N/I	Tronic
Dec 1	0.4	0.2	1.6	0.6	ND	6.6	1.1	1.7	ND	ND	ND	0.46	N/I	Tronic
8	29	1.4	10	1.0	ND	2.2	1.0	5.0	ND	12	ND	0.25	N/I	Tronic
16	10.7	0.8	0.9	0.53	ND	6.5	7.9	3.1	ND	3.4	0.5	0.63	N/I	Tronic
23	5.3	1.5	1.5	1.0	ND	4.3	8.1	1.7	ND	11.0	0.5	0.8	N/I	Tronic
30	7.6	4.9	2.0	4.2	0.6	6.1	2.2	2.5	ND	5.2	0.25	0.6	N/I	Tronic
1976														
Jan 13	9.2	1.1	0.7	0.8	ND	4.0	8.3	1.2	ND	3.2	0.8	1.9	N/I	Tronic
23	11.6	4.4	1.25	0.7	ND	5.6	3.4	6.3	ND	1.2	0.65	2.0	N/I	Tronic
Feb 3	0.8	1.4	2.0	0.7	ND	3.2	5.0	1.3	ND	3.8	1.1	1.3	N/I	Tronic
10	0.3	0.3	8.0	5.0	1.0	6.1	0.9	2.0	ND	4.3	0.5	0.7	N/I	Tronic
17	ND	ND	0.4	0.3	0.3	6.6	0.35	1.6	ND	0.6	0.6	0.25	N/I	Tronic
24	3.0	0.6	2.175	2.2	0.3	3.1	10.2	2.7	ND	6.83	0.01	1.7	N/I	Tronic
Mar 2	7.7	2.9	0.5	0.6	0.2	6.4	3.6	1.3	ND	4.9	ND	1.2	N/I	Tronic
9	18.8	4.7	2.7	2.3	ND	3.2	4.2	4.7	ND	7.3	ND	1.7	N/I	Tronic
16	2.8	0.9	2.4	2.1	ND	6.6	1.1	1.6	ND	0.8	0.2	0.9	N/I	Tronic
23	8.7	4.8	3.8	1.0	ND	3.19	6.7	9.5	ND	10.0	0.2	1.8	N/I	Tronic
30	6.5	3.4	1.8	1.0	ND	8.2	1.99	6.3	ND	1.0	0.15	0.3	N/I	Tronic
Apr 8	8.2	3.8	2.4	1.3	0.1								N/I	Tronic
15	11.7	13.5	1.9	0.5	ND								N/I	Tronic
23	15.0	9.2	3.2	1.6	ND								N/I	Tronic
30	4.5	0.8	0.1	0.1	ND									Tronic
May 11/27						N=9 Av 7.1								Tronic

6387b

TABLE 2-3

CONTAMINANT CONCENTRATIONS
AT TRONIC PLATING COMPANY

	CONCENTRATIONS IN PPM													
NYS	CN	Ni	Cd	Tot.Cr	Cr^{+6}	pH	Cu	Fe	Pb	N	Ag	Zn	SAMPLING LOCATION	SAMPLING ORGANIZATION
CRITERIA	0.4	2.0	0.02	2.0	0.1	6.5-8.5	0.4	0.6	0.1	10.0	0.1	0.6		
DATE														
Jun 1/30						N=16 Av 7.35								
7		0.48	1.13	0.12		3.4	1.4	16.0	0.1			0.3	Pipe to industrial pool(?)	SCDEC
7		0.1	0.02	0.01		7.6	0.15	0.09	0.1			0.02	Final anodizing rinse tank	SCDEC
7		0.1	0.02				0.1	0.05	0.1			0.05	City H_2	SCDEC
7		1.85	1.8	0.23	0.06	3.6	2.0	16.0	0.2			2.3	Industrial leaching pool(?)	SCDEC
Jul 6/29						N=15 Av 7.15							N/I	Tronic
Aug 2/28						N=17 Av 6.97							N/I	Tronic
Nov 1/29						N=14							N/I	Tronic
1978														
Mar 28		0.1	0.09	0.32		8.5	0.07	0.5	0.1		0.02	0.11	N/I	Tronic
1979														
Jun 26	0.5	0.2	0.2		0.02	6.6	0.32		0.2		0.02		N/I	Tronic
Sep 9		0.4	0.69	0.07		6.0	0.33	1.1	0.2		0.02	0.43	Storm drain by rear door-blue green stain leading to drain	SCDEC
11		0.3	2.0	0.15		5.3	0.75	0.85	0.2		1.04	0.48	Old industrial pool w/more than 8.0' of liquid in pool	SCDEC
11		0.4	3.1	0.14		6.1	0.93	1.2	0.2		0.21	1.18	N/I	SCDEC
18		0.2	0.15	0.02		5.8	0.85	1.5	0.2		0.73	0.2	Pool by rear door	SCDEC
18		0.2	0.50	0.22		5.1	0.52	4.5	0.2		0.03	0.7	Cooling water pool(?)	SCDEC
18		0.2	1.17	0.07		5.35	0.45	0.7	0.2		0.06	1.0	Third industrial pool, abandoned(?), discharge noted	SCDEC
18		0.2	1.10	0.11		5.25	0.44	1.0	0.2		0.06	0.7	Fourth industrial pool, abandoned(?), no discharge noted	SCDEC
18		0.2	1.14	0.13		5.5	0.45	1.1	0.2		0.06	0.9	First industrial pool, abandoned(?), actively receiving discharge	SCDEC
18		0.2	0.72	0.18		5.1	0.47	2.6	0.2		0.04	0.5	Second industrial pool, abandoned(?), actively receiving discharge	SCDEC
Nov 14			5.4	3.6		6.5	10.0		3.0		1.0	12.0	First cooling water pool	SCDEC
1980														
Jan 3		0.5	0.87	0.36	0.06	6.05	0.60	2.7			0.11	1.0	First cooling water pool(?)	SCDEC
May 21			0.80								0.02		#2 cooling water leaching pool - plating operation	SCDEC
Aug 5		0.18	0.93			5.1	0.48	1.1	0.2		0.02	0.1	Cooling water, first pool(?)	SCDEC
Oct 1		0.1	4.2	0.06		6.9	0.30	4.2	0.2			0.1	001 outfall to first pool	SCDEC
Dec 3		0.4	3.4	0.06			0.98	2.4	0.2		0.02	0.24	Leaching pool southside of building, closest	SCDEC

6387b

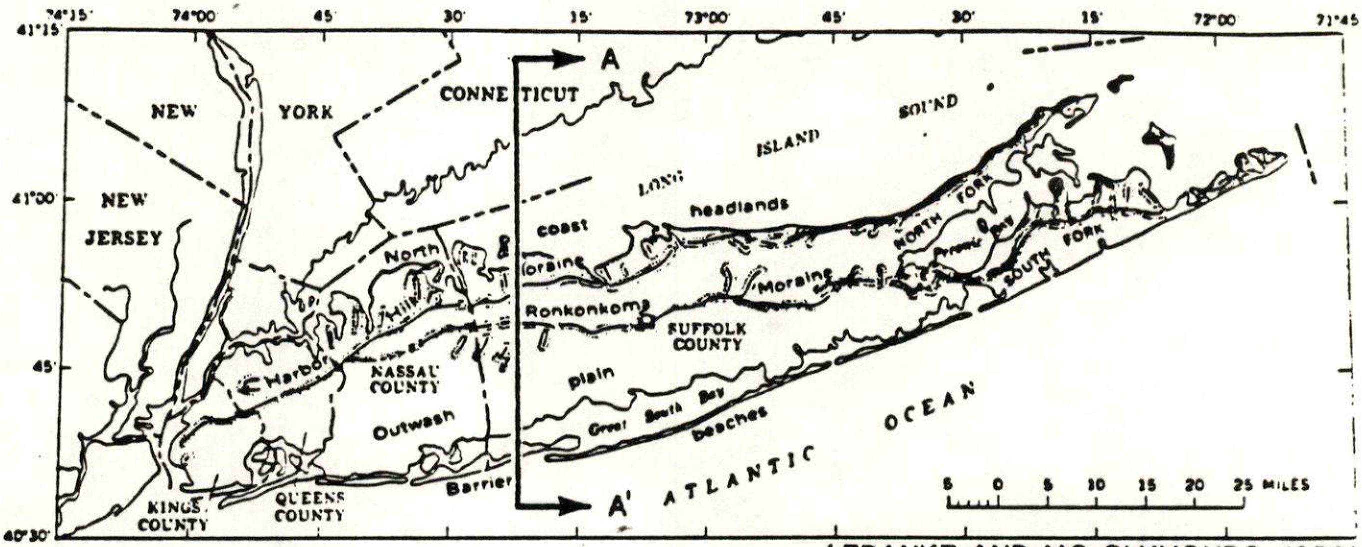
TABLE 2-3

CONTAMINANT CONCENTRATIONS
AT TRONIC PLATING COMPANY

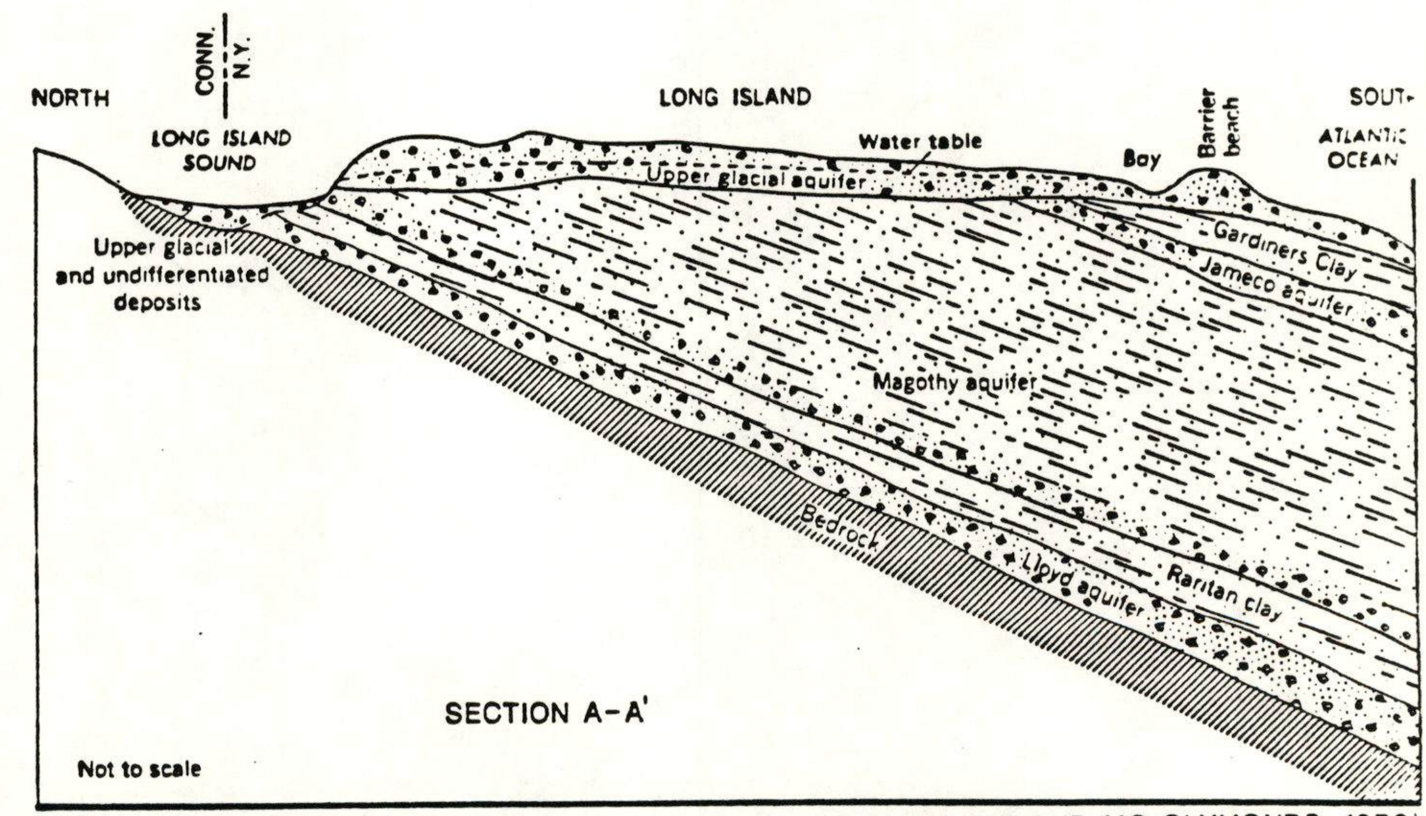
NYS CRITERIA / DATE	CN 0.4	Ni 2.0	Cd 0.02	Tot.Cr 2.0	Cr^{+6} 0.1	pH 6.5-8.5	Cu 0.4	Fe 0.6	Pb 0.1	N 10.0	Ag 0.1	Zn 0.6	SAMPLING LOCATION	SAMPLING ORGANIZATION
	CONCENTRATIONS IN PPM													
1981														
Jun 17		1.0	0.66	0.20	0.021	7.0	0.38	0.8	0.2			0.3	Storm drain rear of Tronic, 33'-40' from north garage door	SCDEC
17		0.5	0.65	0.06		7.0	0.74	4.1	0.2			0.2	Sanitary pool, front lawn, east series, second toward Central Ave.	SCDEC
Aug 31		1.7	10.0	1.0	0.2	5.0	9.0	140	2.6		11.0	1.5	Sanitary pool, front lawn, east series, first pool	SCDEC
1982														
Aug 18		0.8	2.8	2.1	0.02	7.0	8.8	170	3.2		0.1	1.0	Sanitary pool, first in-line(?) front lawn	SCDEC
18		0.7	0.3	0.1		7.0	0.37	1.5	0.2		0.02	0.65	Storm drain NE of Tronic rear door	SCDEC
1983														
Aug 31		0.1	0.2	0.02		5.0	0.6	0.3	0.2			0.3	Second sanitary pool, farthest from building front lawn, east	SCDEC
Oct 5			0.076						0.048				leaching pool(?) grab sample	Ecotest Labs/Tronic
Oct 6			0.20						0.016				Waste water(?) collected by Tronic	Ecotest Labs/Tronic
Dec 7		0.1	0.02	0.02		6.0	0.05		0.2				East side of Tronic, 3"-4" pipe 0.2' abovegrade discharging to storm drain	SCDEC

FIGURE 2-3

GENERALIZED GEOLOGICAL CROSS SECTION OF LONG ISLAND

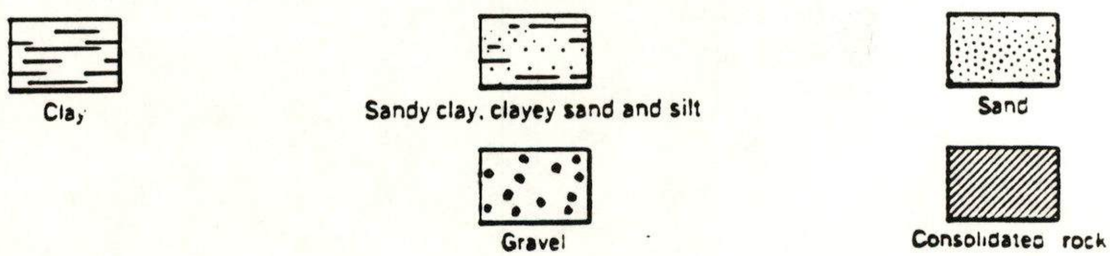


(FRANKE AND MC CLYMONDS, 1972)



(FRANKE AND MC CLYMONDS, 1972)

EXPLANATION



beneath the entire area of Long Island but does not outcrop. Formation thickness ranges from 300 to 600 feet. The formation is divided into a lower unit (the Lloyd sand member) and an upper unit (Raritan clay).

The clay member functions as an aquiclude (confining unit), successfully separating the Lloyd sand member from the overlying Magothy. The clay member also retards the movement of salt water from the overlying Magothy formation into the underlying fresh water in the Lloyd Sand member on southeastern Long Island.

Magothy Formation

The Magothy formation is the thick sequence of non-marine deposits of Late Cretaceous age which overlie the Raritan formation. The Magothy is overlain unconformably at some locations by the Jameco gravel and at others by younger units of Pleistocene age. The lower contact, which is an erosional unconformity, can be recognized by a change from gravelly beds at the lower contact of the Magothy to beds of clay or sandy clay in the Raritan formation. The upper contact of the Magothy formation can be recognized by differences in color, texture and composition between these sediments, the Jameco gravel, and Gardiners clay of the upper Pleistocene sediments.

The Magothy occurs throughout the subsurface of Long Island. Studies indicate that the surface is a gently sloping plain, moderately to highly dissected by streams flowing south and southwest. In response to interdigitating of coarse and fine grained materials the permeability of the Magothy (?) formation is greatest in a direction parallel to bedding and considerably less perpendicular to bedding.

Pleistocene and Recent Series
Jameco Gravel

The Jameco gravel is an irregular body of predominantly coarse sand and gravel deposited on the erosional upper surface of the Magothy formation. This gravel is considered to have been deposited as outwash by glacial meltwater streams, probably of pre-Wisconsin age. An irregularity in the upper portion of the Jameco suggests that the gravel was eroded before the Gardiners clay was deposited. The Jameco gravel underlies about 75 square miles in southeastern Queens and southwestern Nassau Counties.

Jameco gravel is thickest in the deepest parts of valleys cut into the surface of the Magothy formation. This formation is among the most permeable of the water bearing deposits on Long Island. Water in the Jameco gravel is under artesian pressure because of the confinement by the overlying Gardiners clay. As no extensive impermeable beds separate the Jameco gravel and the Magothy formation, both formations constitute a single aquifer.

Gardiners Clay

The Gardiners clay consists mainly of gray and greenish gray clay and silt and locally contains lenses of sand, gravel and sandy clay. It was deposited in shallow bays and estuaries in the southern half of Long Island during an interglacial stage. This clay is overlain by the Upper Pleistocene deposits and underlain at some places by the Jameco gravel and in other by the Magothy formation.

The top of the Gardiners clay ranges from about 50 to 120 feet below sea level. The large range in depth must be associated in part by erosion and in part by deposition on an irregular sea bottom.

The Gardiners clay has a very low permeability and serves as an aquitard and upper confining layer for the Magothy aquifer.

Upper Pleistocene and Recent Deposits

The upper Pleistocene and Recent deposits, with a total thickness of approximately 180 feet, encompass all sediments from the top of the Gardiners clay to ground surface. These sediments are composed of the following units:

(1) a body of glacial till which in part forms the Ronkonkoma recessional moraine;
(2) an extensive body of stratified sand and gravel deposited as glacial outwash;
(3) a thin deposit of marine clay, called the "20 foot" clay, which occurs in the southern part of Nassau and Queens counties and is sometimes interbedded in the outwash plain deposits, and
(4) discontinuous, lenticular bodies of peat, silt, clay, sand, gravel and artificial fill of Recent age which underlie bays, marshes, beaches and stream valleys.

The till occurs north, east and west of the site in terrain of high relief (Manneto Hills, northwest and the Half Hollow Hills to the northeast). The till is not water bearing except for small bodies of perched water.

Outwash

The outwash establishes the bulk of the upper Pleistocene deposits and also underlies the till and deposits of Recent age. These sediments rest unconformably on the Gardiners clay and upon the Magothy (?) in areas were the Gardiners clay and Jameco gravel are absent. Logs of wells in the southern part of Long Island show the outwash can be separated into upper and lower portions by the "20 foot" clay.

The outwash ranges in thickness from about 30 to 120 feet, thickening toward the north in the direction of the Ronkonkoma moraine. The sediments consist of stratified beds of fine to coarse sand, and sand with gravel.

The outwash deposits are highly permeable and contain large quantities of water. Hydraulic conductivities of 1.9×10^3 gpd/ft^2 and transmissivities of 1.9×10^5 gpd/ft are common, with groundwater velocities ranging from 1 to 4 ft/day (McClymonds and Franks, 1972). The groundwater in the outwash occurs mainly under water table conditions. Outwash deposits are the most permeable beds of wide extent in the study area. The deposits are coarse grained and well sorted and have high permeability with porosities ranging from 30 to 40 percent (Veatch et al., 1906)

"20-foot" Clay

The name "20-foot" clay is assigned to thin beds of green gray marine clay at elevations of 20 to 35 feet below sea level in the southern portion of Nassau County. The clay is lithologically similar to the Gardiners clay. Because it is often separated from the Gardiners clay by outwash deposits, Perlmutter and Geraghty (1963) regard the shallower clay as a separate unit.

The "20 foot" clay ranges in thickness from 0 to approximately 40 feet. Well logs indicate this unit to be south of Sunrise Highway but a few suggest the clay may have been deposited in several narrow embayments north of Sunrise Highway. Little data is available regarding the permeability of the "20-foot" clay, although its grainsize and degree of sorting indicate it is a poor transmitter of water.

Recent Deposits

The Recent deposits, not including soil and artificial fill, occur beneath bays, in marshlands, on barrier beaches and in stream valleys Recent deposits are the upper most and stratigraphically the youngest sediments and are immediately underlain by outwash. The Recent deposits reach a maximum thickness of about 40 feet and are too thin to be represented on geological cross-section.

Soils

Soils proximal to the Tronic Plating Corporation site are composed of three soils types as classified by the USDA Soil Conservation Service in the County of Suffolk.

The three soil types are listed as; urban land (Ur), Riverhead sandy loam, 0-3 percent slopes (RdA), and Riverhead and Haven soils, 0 to 8 percent slopes (RhB). A description of the soil types are as follows.

Urban land (Ur) consists of areas that are more than 80% covered by buildings and pavements, such as parking lots, business districts in large villages, densely developed industrial parks. Usually examination and identification of the soils in these areas is impractical.

Riverhead Series

The Riverhead Series is often described as a deep, well drained, moderately coarse textured soil formed in a mantle of sandy loam or fine sandy loam over thick layers of coarse sand and gravel.

The Riverhead sandy loam is generally found on outwash plains in large and uniform mantles. The hazard of erosion is slight on Riverhead soils. The soil is predominant in the western portion of Suffolk County and is primarily utilized for housing developments and industrial parks. The Riverhead Series comprises approximately 22 percent of the area of Suffolk County.

Riverhead and Haven soils have a moderate to high available moisture capacity. Permeability is moderately rapid in the surface layer and in the subsoil and very rapid in the substratum. Soil reaction is strongly acid to very strongly acid. The rootzone is mainly in the upper 25 to 35 inches..

Groundwater Resources

Groundwater supplies the entire population of both Nassau and Suffolk Counties on Long Island. The upper Glacial aquifer is the primary water supply source for private, agricultural and small industrial wells. The upper Glacial remains a public water supply source in some areas of Long Island where shallow contamination is not a major problem and the Magothy and deeper aquifers are either absent or saline.

In the site area, homes and business are supplied by two water companies. The East Farmingdale Water District supplies the Site and areas to the North. Suffolk County Water Authority supplies areas to the south. Each wellfield may consist of one or more wells. Each well generally supplies one million gallons of water per day or more when in operation and each is completed in the Magothy aquifer.

2.2.2 Climate

Long Island is located between 40° and 42° north latitude in a temperate-climate belt. The mean annual temperature on the island, approximately 51°F (11°C), is several degrees higher than the average for all of New York State because of the tempering influence of the bordering Atlantic Ocean and Long Island Sound. Minimum average monthly temperatures on Long Island occur in February and range from 28°F (-2°C) to 32°F (0°C); maximum average monthly temperatures occur in July and range from about 69°F (21°C) to 75°F (24°C). Average temperatures decrease from east to west, and south shore temperatures are slightly less than north shore temperatures at the same longitude. Maximum and minimum temperatures of record on Long Island are 103°F (39°C) and -14°F (-26°C) respectively (Soil Conservation Service: USDA, p. 96, 1975).

Precipitation averages about 44 inches per year and is fairly well distributed throughout the year on Long Island. The prevailing wind direction is northwest during most of the year, except during the summer months when south and southwest winds are predominant (Franke and McClymonds, pF4, 1972).

In 1970, the population of Suffolk County was 1,116,672 (Suffolk County Soil Survey, 1975). The county has lost all semblance of rural life in the western parts, and suburban developments are gradually moving eastward.

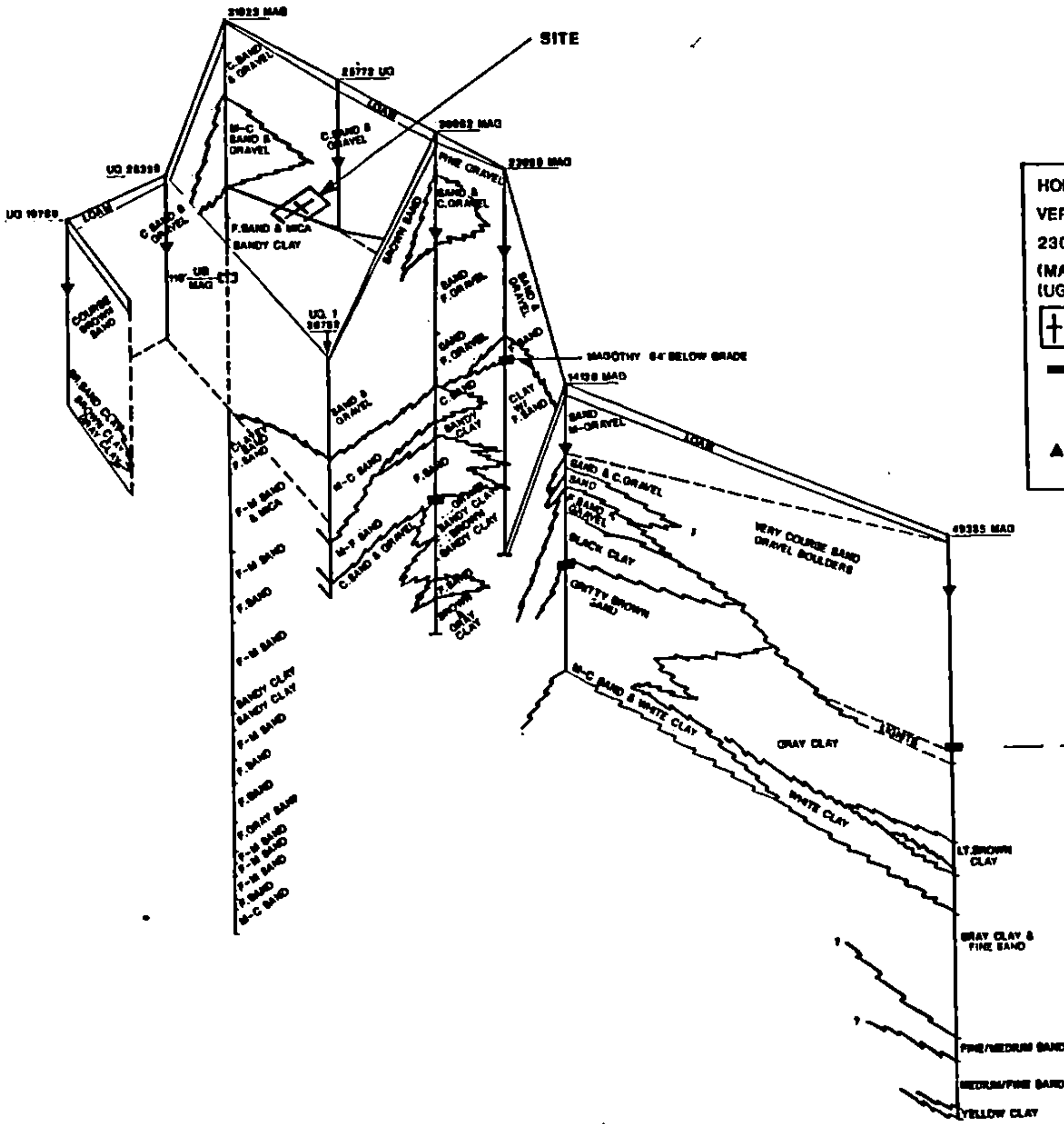
Approximately 498,000 people reside within a three mile radius of the Tronic Plating site. This population draws from local aquifers. The nearest public water supply wellfield is located about 3000 feet from the site. The nearest reported private well is located at 222 Central Ave., approximately 1400 feet east of the Tronic Plating Company site.

2.3 PRIOR DATA

2.3.1 Groundwater

In order to characterize the regional groundwater quality, data from the public wellfields and from the U S Geological Survey (USGS) observation wells were collected from the USGS and Suffolk County Department of Health. Figure 2-4 shows fourteen wells and their relation to the site.

Fifty-five wells are documented (USGS) in the 10.26 square mile area surrounding the site. Of these, fourteen well records were selected to prepare a panel diagram (Fig. 2-4) illustrating subsurface sediment conditions about the site. Only one upgradient well (S-43811) within 0.75 miles and two downgradient wells (S-75033) and (S-21801) over 3.0 miles from the site, have any supplementary water quality information. The most recent water quality data available is listed in Table 2-4. No reasonable conclusions can be drawn from this paucity of information.



HORIZONTAL SCALE 1" = 750'
VERTICAL SCALE 1" = 50'
23059 WELL#SC DEC REFERENCE
(MAG) MAGOTHY } AQUIFER IN WHICH
(UG) UPPER GLACIAL } WELL IS SCREENED
SITE LOCATION
CONTACT-UPPER GLACIAL DEPOSITS AND TOP OF MAGOTHY (?) FM.
▲ GROUNDWATER LEVELS (CONSTRUCTION LOGS)

U.S. ENVIRONMENTAL PROTECTION AGENCY

TRONIC PLATING SITE

FIGURE 2-4

COMPOSITE CROSS SECTIONAL VIEW
SUBSURFACE DEPOSITS
TRONIC PLATING SITE

EBASCO SERVICES INCORPORATED

TABLE 2-4

GROUNDWATER QUALITY DATA
NEAR TRONIC PLATING SITE

Well S-43811 upgradient (northeast of Site)

Date	4/2/75	2/26/76	4/21/77	8/9/79	1/10/80	4/14/80	8/18/80	8/27/81	6/24/82	7/27/82
Spec. Cond.	440	430	510	560	550	560	560	-	-	390
pH	5.80	5.50	5.70	6.20	5.40	5.60	5.60	5.90	-	5.80
Temp, C.	12.0	12.0	13.0	14.0	12.0	12.0	13.0	13.0	13.0	12.5
O_2, dissolved mg/l	2.3	3.0	3.1	6.6	7.6	5.2	4.8	5.0	6.7	4.0
Chloride, dissolved	34	30	3.0	33	31	29	32	29	30	30

Well S-75033 downgradient (southwest of site)

Date	9/10/86	9/11/86	9/12/86	6/12/87
Spec. Cond.	25	244	28	30
pH	5.18	5.50	4.96	5.45
Temp, C.	-	12.0	-	13.0
O_2, dissolved mg/l	-	2.0	3.0	3.0
Chloride, dissolved mg/l	4.1	16.0	4.3	3.3

Well S-21801 downgradient (southeast of site)

Date	8/15/73
Specific Conductance	124
pH	6.0
Temp, C.	12.0
O_2, dissolved mg/l	-
Chloride, dissolved mg/l	6.2

2.3.2 Chemical Characterization of the Site

No known testing of soil and groundwater at the site have been conducted. Based on the Wastewater Treatment System report for Tronic Plating (Benson and Burns, 1974), about 1.25 million gallons of waste were produced a year. The apparent source of these wastes was rinse water from electroplating, anodizing, and etching processes. These liquid wastes were discharged into leaching pits at the Tronic facility. Assuming a minimum of 15 years of operation, about 19 million gallons of waste were released into these pits. Between 1979 and 1982, the Suffolk County Department of Health Services tested waste material in the leaching pits and detected copper, silver, iron, zinc, lead, cadmium and cyanide. Table 2-2 shows the results of analyses performed on various process and waste streams at the Tronic Plating facility. In addition, heavy metal contamination was suspected in a storm drain located northeast of the Tronic Plating office (SCDHS, 1982).

2.3.3 Leaching Pits

Based on available information (Bensin & Burns Engineering Company, 1974; Woodward-Clyde, 1983), the overall locations of the four leaching pits and one sanitary pit are shown in Figure 2-5. The dimensions of the leaching pits are given in Figure 2-6.

2.4 DISCUSSION

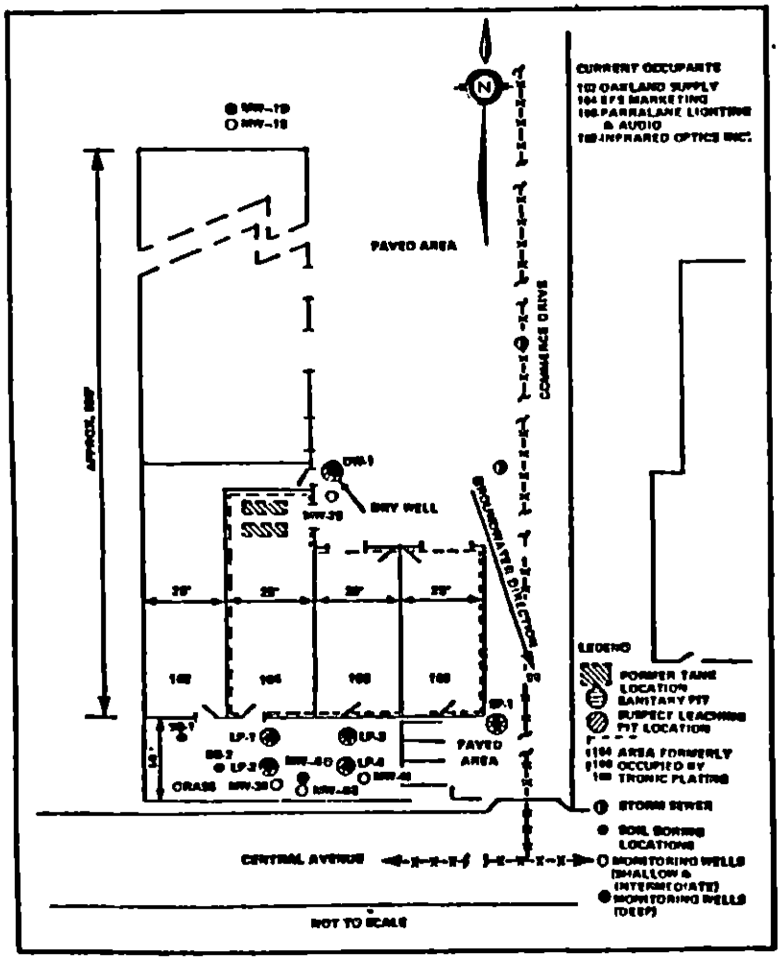
Based on information presented in previous sections, the probability of site contaminants impacting groundwater is high. Site history and hydrogeological conditions indicate contaminants have been introduced to groundwater because:

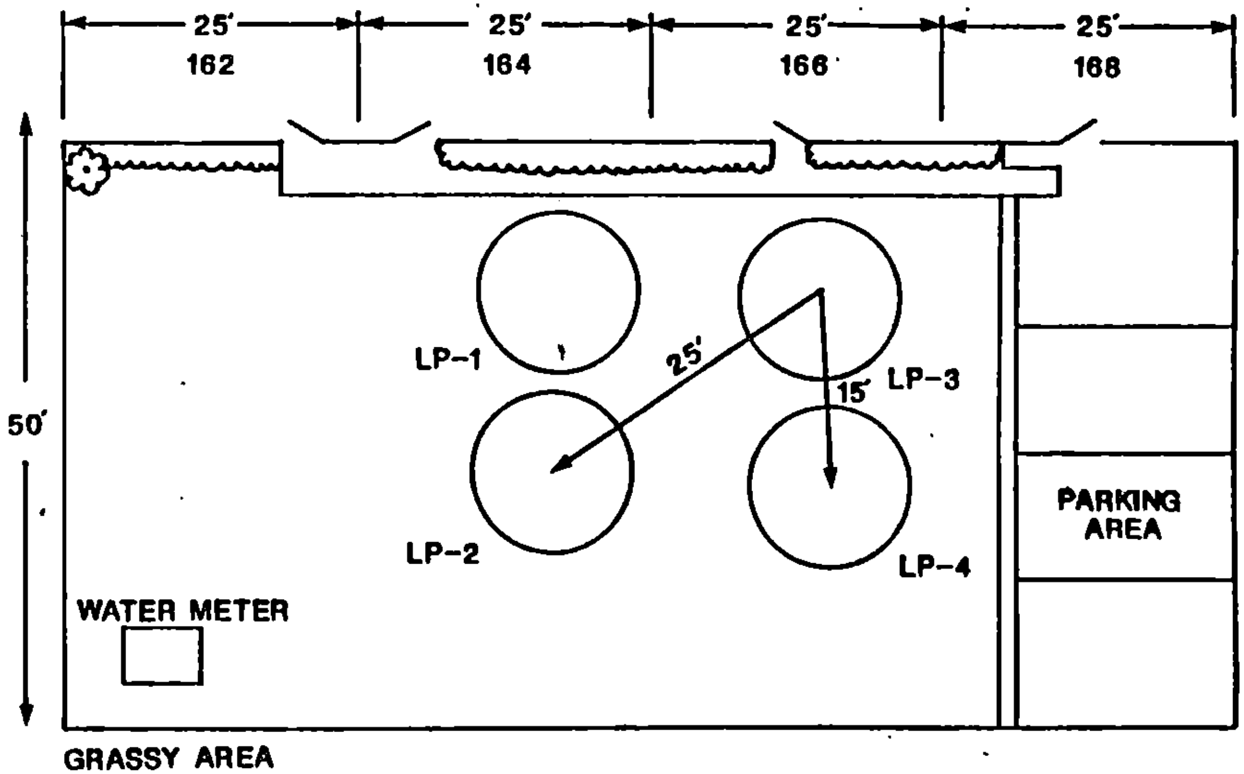
- o Contaminant effluent was concentrated and restricted to a small subsurface area without adequate containment;
- o Leaching pits were allegedly filled (material undetermined) at the end of site plating operations in March 10 1984;
- o High subsurface permeability and porosity facilitate contaminant access to groundwater, mobilized by precipitation events, and
- o Groundwater velocity beneath the site is high (1 to 4 ft/day) easily transporting contaminants downgradient from the site.

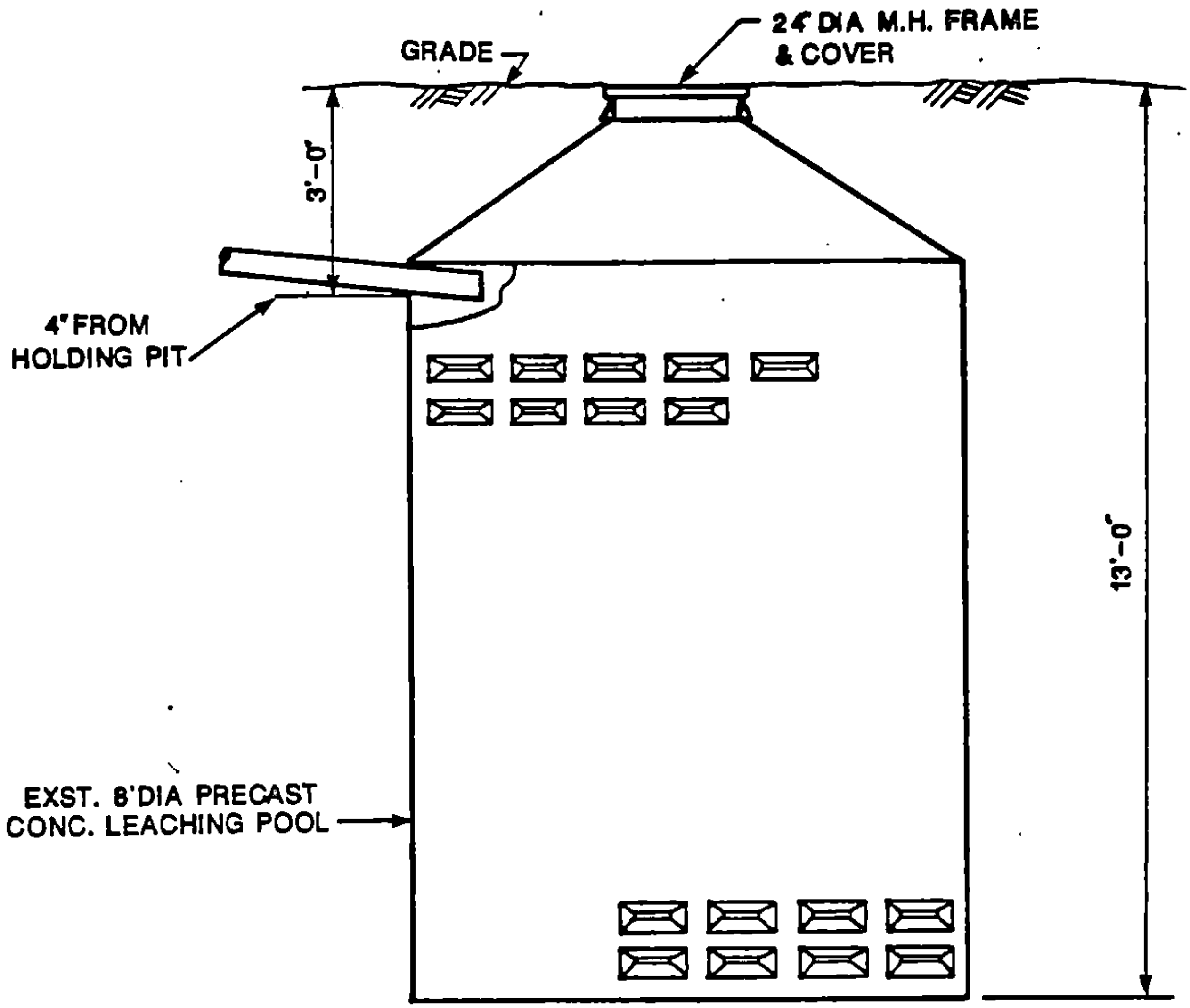
Because of the potential for off-site migration, Ebasco suggests that the RI/FS be carried out in a phased approach. During the early phases, work efforts will concentrate on the site, and during the latter phases, work efforts will concentrate on the off-site plating-waste contaminated plume. Two phases are 1) lack of knowledge of the extent of contamination at the site and 2) lack of knowledge of other pollution sources in the general area of concern.

FIGURE 2-5
LEACHING PIT CONFIGURATION – EXPANDED PROSPECTIVE TRONIC PLATING SITE

TRONIC PLATING







SCALE 3/8 =1'-0"

U.S. ENVIRONMENTAL PROTECTION AGENCY
TRONIC PLATING SITE
FIGURE 2-6 EXISTING LEACHING PITS DIAGRAM
EBASCO SERVICES INCORPORATED

3.0 SCOPING OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY

The RI/FS objectives for the Tronic Plating Site are defined in Subsection 3.1 and include: a preliminary risk assessment, the identification of current data gaps, and the scoping, screening and evaluation of remedial alternatives. Specific data requirements are defined in Subsection 3.2 with reference to applicable or relevant and appropriate requirements (ARAR) and data quality objectives (DQOs).

3.1 RI/FS OBJECTIVES

The primary objectives of the RI are to gather all of the necessary information for site characterization in terms of lateral and vertical extent of contamination, and contamination source characterization. The information from the RI will be used for risk assessment, and treatability tests required for the FS. Sampling and analysis of media such as soil and groundwater will generate data used to assess the existing and projected public health and environmental risks within and around the site and to delimit preliminary treatability bench tests. The objectives of the FS are to screen, test and evaluate remedial alternatives for the site. The Feasibility Study will provide information required by EPA to prepare a Record of Decision (ROD) which specifies the recommended remedial alternative.

In order to achieve these objectives in a timely, cost-effective and technically supportable manner, the following key questions have been considered in developing the Work Plan:

- o What contaminants and pathways have actual or potential impacts on public health or the environment?
- o Which preliminary remedial alternatives can be identified that might be feasible and adequate to protect the public health and the environment, and what additional data may be needed to evaluate these alternatives?
- o what action levels and concentration levels established by ARARs or risk assessment are necessary to minimize or eliminate potential adverse impacts on health or the environment?
- o What quality of data and information are appropriate for performing risk assessment and remedial alternative evaluation, and how can these data be obtained quickly and efficiently during the site investigation?

3.1.1 Preliminary Risk Assessment

This section presents a preliminary assessment of public health risk associated with the Tronic Plating site. It is based upon information on site history, hydrogeology, land use, demography, and contaminant type and distribution.

As summarized in Section 2.3.2, past investigations of this site have indicated the presence of heavy metals and cyanide in the leaching pits. Heavy metal contamination is also suspected in a storm drain located northeast of the Tronic Plating office. Some of these contaminants have been found in waste material on site at levels which exceed New York State groundwater standards (e.g. lead, cadmium). Depending upon their probability of exposure to these chemicals via different pathways, which will be evaluated in Ebasco's RI, the resident and/or transient population may be subjected to certain health risks. The various exposure pathways in this regard are discussed below.

Groundwater

The contaminants in the leaching pits and runoff from unprotected indoor tankspill had the potential for reaching groundwater, migrating downgradient and entering public water supplies as well as private wells. For this reason, groundwater monitoring wells will be installed and sampled along with a survey of any existing potable wells in the area so that this potential exposure route can be evaluated with confidence.

Surface Water

The geology of the site suggests runoff from the storm drain percolates back to the groundwater. Consequently, surface water will not be investigated in this RI.

Soil

The site is located in an industrial area. There are no people involved in recreational activities or children playing on site. In addition, the site is mostly paved. Exposure through direct soil contact or soil ingestion will not be investigated.

Air

With the exception of a relatively small area of lawn (about 50 x 75 ft), the site is largely paved. Therefore, the exposure via the air route will not be evaluated.

3.1.2 Review of Existing Data Base

Based on the potential exposure pathway at the Tronic Plating site and review of the existing data base, the environmental data needed for characterizing contamination on-site are as follows:

- o Identification of on-site groundwater contaminants by sampling installed monitoring wells;
- o Survey of nearby off-site wells for locations and usage;
- o Sample off-site wells;
- o On-site soil contamination characterization.

3.1.3 Scoping of Remedial Alternatives

Existing information is not sufficient to determine the level of soil and groundwater contamination at the Tronic Plating Company site. Based on the analytical results obtained by SCDHS (Table 2-2), the metals copper, silver, zinc, iron, lead and cadmium, as well as cyanide are assumed to be the contaminants of concern. However, other metals, such as chromium, may also be present. Because no historical data are available on the use and discharge of organic compounds at this facility, no judgment on the nature or extent of soil and groundwater contamination by these compounds can be made. Nevertheless, samples obtained during the RI/FS will be analyzed to confirm their presence or absence.

If groundwater is pumped and treated to remove heavy metals and cyanide, it may also require treatment for organics, in order to comply with the ARAR's (see Section 3.2). Therefore, copper, silver, zinc, iron, lead, cadmium, cyanide and organics are considered in this preliminary identification of remedial alternatives.

Based on the project approach discussed in Section 1.1, the Tronic Plating Company site is treated as a single operable unit in this Work Plan. Given the existing data and this operable unit specification, tentatively identified remedial alternatives are discussed below and summarized in Tables 3-1 and 3-2. Data requirements are also identified in these tables.

No Action

The no action alternative will be evaluated to provide a comparative basis for other remedial alternative evaluations. At the site, the no action alternative means that no remedial actions for soil and groundwater containment or treatment will be designed and implemented. The no action alternative would include public health and environmental evaluations (including risk assessment), long-term groundwater monitoring, and institutional controls (e.g., limit the use of private well water for drinking and irrigation purposes).

TABLE 3-1

PRELIMINARY ONSITE GROUNDWATER REMEDIAL ALTERNATIVES

RESPONSE ACTION	REMEDIAL ALTERNATIVE	DATA REQUIREMENT
NO ACTION	o GROUNDWATER MONITORING	RISK ASSESSMENT
	o INSTITUTIONAL CONTROL	
PUMPING	o GROUNDWATER DIVERSION	GEOHYDROLOGICAL DATA
TREATMENT	PUMP AND ON-SITE TREATMENT	GROUNDWATER CHARACTERIZATION
	METALS	
	o CHEMICAL PRECIPITATION	TREATABILITY STUDIES
	o ION EXCHANGE	
	CYANIDES	
	o ALKALINE CHLORINATION	
	VOLATILES (IF ANY)	
	o AIR STRIPPING	
	ORGANICS (IF ANY)	
	o CARBON ADSORPTION	
	o CHEMICAL OXIDATION	
	o AEROBIC BIODEGRADATION	
DISPOSAL	o STORM SEWER	REGULATORY REQUIREMENTS
	o SANITARY SEWER	

TABLE 3-2

PRELIMINARY ONSITE SOIL REMEDIAL ALTERNATIVES

RESPONSE ACTION	REMEDIAL ALTERNATIVE	DATA REQUIREMENT
NO ACTION	o GROUNDWATER MONITORING o INSTITUTIONAL MONITORING	RISK ASSESSMENT
CONTAINMENT	o IMPERMEABLE BARRIER (GROUT CURTAINS + BOTTOM SEALING)	GEOHYDROLOGICAL DATA
TREATMENT	EXCAVATION/ON-SITE TREATMENT	SOIL CHARACTERIZATION
	METALS: o CHEMICAL FIXATION o SOIL WASHING	TREATABILITY STUDIES
	CYANIDES: o SOIL WASHING	
	VOLATILES (IF ANY) o MECHANICAL AERATION	
	ORGANICS (IF ANY) o SOIL WASHING	
IN-SITU TREATMENT		
	o IN-SITU VITRIFICATION	SOIL CHARACTERIZATION TREATABILITY STUDY
DISPOSAL	o OFF-SITE LANDFILL	AVAILABLE LANDFILL IDENTIFICATION
	o ON-SITE USE AS FILL	REGULATORY REQUIREMENTS

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Containment

Containment alternatives would include: 1) impermeable barriers and caps to completely isolate the contaminated soil from contact with groundwater, and 2) diversion of groundwater from contact with contaminated soil. Since the site may not have a continuous underlying low permeability clay layer, and the aquifers (upper glacial and Magothy) are very deep, one impermeable barrier which might be applicable to the site would be grout curtains plus bottom sealing.

Groundwater Treatment and Disposal

Contaminated groundwater at the site can be pumped and treated onsite. The treated groundwater would be discharged to onsite/offsite storm or sanitary sewers. Heavy metals can be removed from the groundwater by chemical precipitation (e.g., lime and sodium hydroxide) and/or ion exchange. Alkaline chlorination can be used to chemically oxidize the cyanide to carbon dioxide and nitrogen. If the RI results indicate that organics are of concern, air stripping can be used to remove volatile organics. Other organics can be removed by carbon adsorption, chemical oxidation (e.g., ozonation, hydrogen peroxide, etc.), and aerobic biodegradation.

Soil Treatment and Disposal

Contaminated soil at the site can be handled by either excavation/onsite treatment/disposal or in-situ treatment. For the former case, onsite treatment would involve chemical fixation and soil washing, and the fixated or cleaned soil would be disposed of either by landfilling offsite or by using as backfill on site. For the latter case, in-situ vitrification would be used.

Chemical fixation involves the addition of siliceous material combined with setting agents such as lime and cement resulting in a stabilized and solidified product. Commercial proprietary fixation agents and processes can be used for both inorganic and organic contaminated soils.

Soil washing involves chemical and physical processes. The chemical process applies solvent extraction methodologies to remove contaminants (metals, cyanides and organics) from the soil. Physical processes may include classification of the contaminated soil prior to extraction, removal of excess moisture from the treated soil after extraction, and recovery of the spent solvent. The wastewater generated from soil washing can be treated like the contaminated groundwater discussed previously.

In-situ vitrification uses an electric current passed between electrodes placed in the ground to convert soil and contaminants into a stable glass material. Heat from the electric current decomposes organic matter, and solubilizes and encapsulates metallic and other inorganic materials in the vitrified mass. When the electric current ceases, the molten mass cools and solidifies.

3.2 DETERMINATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

3.2.1 Determination of ARARs

The ARARs preliminarily identified below have been categorized as "applicable," "relevant and appropriate," and "to be considered," based upon EPA guidance in the existing National Contingency Plan (50 Fed Reg 47946-47950, November 20, 1985), as modified by the Superfund Amendment and Reauthorization Act of 1986 (SARA). Primary consideration is given to these remedial alternatives that attain or exceed the criteria presented by those regulations found to be "Applicable" or "Relevant and Appropriate". Specific criteria are presented in Table 3-3 for some of the compounds previously detected on the site.

SARA defines ARARs as:

- o any standard requirement, criteria, or limitation under any federal environmental law; and
- o any promulgated standard, requirement, criteria, or limitation under a state environmental or facility siting law that is more stringent than any federal standard, requirement, criteria, or limitation.

The purpose of this definition is to make CERCLA responses consistent with both Federal and state environmental requirements.

Within these jurisdictional boundaries ARARs are further segregated in accordance with the activity they are expected to affect. ARARs that relate to the level of pollutant allowed are called contaminant specific; ARARs that relate to the presence of a special geographic or archeologic area are called location-specific; and ARARs that relate to a method of residual response are called action-specific.

3.2.2 Consideration of ARARs During the RI/FS

Note that as the RI/FS process continues, more ARARs will be considered and developed. Specifically, ARARs will be considered at six key intervals.

1. Task 3 - Field Investigation (see Section 4.3): Consider ARARs when determining the data to be collected in the field investigation.
2. Task 6 - Public Health Evaluation (see Subsection 4.6.1): Consider ARARs during the analysis of risk to public health and the environment.

TABLE 3-3

WATER QUALITY REGULATORY REQUIREMENTS

CHEMICAL	SAFE DRINKING WATER ACT MCLs (mg/l)	CLEAN WATER ACT Water Quality Criteria for Human Health — Adjusted for Drinking Water Only a/	SAFE DRINKING WATER ACT Health Advisories (mg/l)			NEW YORK STATE CLASS GA GROUNDWATER STANDARDS Criteria in Milligrams per Liter Unless Otherwise Specified
			1-Day	10-Day	Longer Term	
Acenaphthene		20 ug/l (Organoleptic)b/				
Aldrin		0 (1.2 ng/l)				ND
Antimony		146 ug/l				
Arsenic	0.05	(25 ng/l)				0.025
Barium	1.0					1.0
Benzene	0.005	0 (0.67 ug/l)		0.23	0.07	ND
Beryllium		0 (3.9 ng/l)				
*CADMIUM	0.01	10 ug/l				0.01
Carbon tetrachloride	0.005	0 (0.42 ug/l)	0.2	0.02		5 ug/l
Chlordane		0 (22 ng/l)	0.0625	0.0625	0.0075	0.1 ug/l
1,2-Dichloroethane	0.005	0 (0.94 ug/l)	Insufficient Data			
1,1,1-Trichloroethane	0.200	19 mg/l			1.0	
1,1,2-Trichloroethane		0 (0.6 ug/l)				
1,1,2,2-Tetrachloroethane		0 (0.17 ug/l)				
Monochloroethane		Insufficient data				
1,1-Dichloroethane		Insufficient data				
1,1,1,2-Tetrachloroethane		Insufficient data				
2,6-Dichlorophenol		0.2 ug/l (Organoleptic)				
2,4,5-Trichlorophenol		2600 ug/l				
2,4,6-Trichlorophenol		0 (1.8 ug/l)				
3-Methyl-4-chlorophenol		3000 ug/l (Organoleptic)				
bis-(2-Chloroethyl) ether		0 (30 ng/l)				1.0 ug/l
bis-(2-Chloroisopropyl) ether		34.7 ug/l				
Chloroform	0.1d/	0 (0.19 ug/l)				100 ug/l
2-Chlorophenol		0.1 ug/l (Organoleptic)				
*CHROMIUM Cr^{+6}	0.05	50 ug/l				0.05
Cr^{+3}		170 mg/l				
*COPPER		1 mg/l (Organoleptic)				1.0
*CYANIDE		200 mg/l				0.2
DDT		0 (1.2 ng/l)				ND
Dichlorobenzenes (all isomers)		470 ug/l				4.7 ug/ml
Dichlorobenzidines		0 (20.7 ng/l)				

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TABLE 3-3

WATER QUALITY REGULATORY REQUIREMENTS

CHEMICAL	SAFE DRINKING WATER ACT MCLs (mg/l)	CLEAN WATER ACT Water Quality Criteria for Human Health -- Adjusted for Drinking Water Only a/	SAFE DRINKING WATER ACT Health Advisories (mg/l)			NEW YORK STATE CLASS GA GROUNDWATER STANDARDS Criteria in Milligrams per Liter Unless Otherwise Specified
			1-Day	10-Day	Longer Term	
Dichloromethane		See Halomethanes	13	1.3	0.15	
2,4-Dichlorophenol		3.09 mg/l				
Dichloropropanes		Insufficient Data				
Dichloropropenes		87 ug/l				
Dieldrin		0 (1.1 ng/l)				ND
2,4-Dimethylphenol		400 ug/l (Organoleptic)				
2,4-Dinitrotoluene		0 (0.11 ug/l)				
Endosulfan		138 ug/l				
Endrin	0.0002	1 ug/l				ND
Ethylbenzene		2.4 mg/l				
Fluoranthene		188 ug/l				
Halomethanes		0 (0.19 ug/l)				
Heptachlor		0 (11 ng/l)				ND
Hexachlorobutadiene		0 (0.45 ug/l)				
Lindane (99% gamma-HCH)						ND
Hexachlorocyclopentadiene		206 ug/l				
Isophorone		5.2 mg/l				
*LEAD	0.05	50 ug/l				0.025
Mercury	0.002	10 ug/l				0.002
Methoxychlor	0.1					35.0 ug/l
Methyl Ethyl Ketone			7.5	0.750		
Naphthalene		Insufficient Data				
Nickel		15.4 ug/l				
Nitrobenzene		19.8 mg/l				
Dinitrophenol		70 ug/l				
Mononitrophenol		Insufficient Data				
n-Nitrosodiphenylamine		0 (7.0 ug/l)				
Pentachlorophenol		1.01 mg/l				21 ug/l
Phenol		3.5 mg/l				0.001
Dimethylphthalate		350 mg/l				
Diethylphthalate		434 mg/l				
Dibutylphthalate		44 mg/l				770 ug/l
Di-2-ethylhexylphthalate		21 mg/l				
Polychlorinated biphenyls (PCBs)		0 (12.6 ng/l)	0.125	0.0125		0.1 ug/l
Polynuclear aromatic hydrocarbons (PAHs)		0 (3.1 ng/l)				

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TABLE 3-3

WATER QUALITY REGULATORY REQUIREMENTS

CHEMICAL	SAFE DRINKING WATER ACT MCLs (mg/l)	CLEAN WATER ACT Water Quality Criteria for Human Health -- Adjusted for Drinking Water Only a/	SAFE DRINKING WATER ACT Health Advisories (mg/l)			NEW YORK STATE CLASS GA GROUNDWATER STANDARDS Criteria in Milligrams per Liter Unless Otherwise Specified
			1-Day	10-Day	Longer Term	
Selenium	0.01	10 ug/l				0.02
*SILVER	0.05	50 ug/l				0.05
Sulfate						250
2,3,7,8-TCDD		0 (0.00018 ng/l)				3.5 x 10^{-5} ug/l
Tetrachloroethylene		0 (0.88 ug/l)	2.3	0.175	0.02	
Thallium		17.8 ug/l				
Toluene		15 mg/l	21.5	2.2	0.34	
Toxaphene	0.005	0 (26 ng/l)				ND
Trichloroethylene	0.005	0 (2.8 ug/l)	2.0	0.2	0.075	
Trihalomethanes (total)e/	0.1					
Vinyl chloride	0.002	0 (2.0 ug/l)				5.0 ug/l
Xylenes			12	1.2	0.62	
*ZINC		5 mg/l (organoleptic)				5
Styrene						931 ug/l

a/ These adjusted criteria, for drinking water ingestion only, were derived from published EPA Water Quality Criteria (Federal Register 45:79318-79379, November 28, 1980) for combined fish and drinking water ingestion and for fish ingestion alone. The adjusted values are not official EPA Water Quality Criteria, but may be appropriate for Superfund sites with contaminated ground water. In the derivation of these values intake was assumed to be 2 liters/day for drinking water and 6.5 grams/day for fish, and human body weight was assumed to be 60 kilograms. Values for bioconcentration factor carcinogenic potency, and acceptable daily intake were those used for water quality criteria development.

b/ Criteria designated as organoleptic are based on taste and odor effects, not human health effects. Health-based Water Quality Criteria are not available for these chemicals.

c/ The criterion for all carcinogens is zero; the concentration given in parentheses corresponds to a carcinogenic risk of 10^{-6}. Water quality criteria documents present concentrations resulting in carcinogenic risks of 10^{-5} to 10^{-7}. To obtain concentrations corresponding to risks at 10^{-4} and 10^{-5}, the 10^{-6} concentration should be multiplied by 100 and 10, respectively. To obtain concentrations corresponding to risks of 10^{-7} and 10^{-8}, the 10^{-6} concentration should be divided by 10 and 100, respectively.

d/ Chloroform is one of four trihalomethanes whose sum concentration must be less than 0.1 mg/l.

e/ Total trihalomethanes refers to the sum concentration of chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

ND Not Detectable

MCL Maximum Contaminant Level

* Compounds that are suspected contaminants

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3. Task 9 - <u>Development of Remedial Response Objectives (see Subsection 5.1.1):</u> Compare site data base to ARARs.

4. Task 9 - <u>Identification of Applicable Technologies and Assembly of Alternatives (see Subsection 5.1.2):</u> Utilize ARARs specific to site conditions for development of action levels, specific response objectives, and remedial alternatives relative to criteria defined in 40 CFR 300.68(f). Also, identify ARARs that apply to the formulated alternatives.

5. Task 9 - <u>Screening of Remedial Technologies/Alternatives (see Subsection 5.1.3):</u> Consider ARARs when assessing the effectiveness of an alternative, as defined in 40 CFR 300.68(g)(3).

6. Task 10 - <u>Remedial Alternatives Evaluation (see Section 5.2):</u> Evaluate each alternative to the extent it attains or exceeds ARARs, as defined in 40 CFR 300.68-(h)(2)(iv).

The conclusions on ARARs reached at these intervals will be used as a guide to evaluate the appropriate extent of site cleanup, to aid in scoping and formulating proposed treatment technologies and to govern the implementation/operation of the selected action. As with the preliminary identification below, they are developed by taking into account the following:

- o Contaminants suspected to be at the site;
- o Chemical analyses to be performed;
- o Types of media to be sampled;
- o Geology and other site characteristics;
- o Use of the resource/media;
- o Level of exposure and risk;
- o Potential transport mechanisms;
- o Purpose and application of the potential ARARs; and
- o Remedial alternatives that will be considered for the site.

3.2.3 Preliminary Identification of ARARs

3.2.3.1 Potential Applicable or Relevant and Appropriate Requirements

The NCP and the CERCLA Compliance Policy define applicable requirements as the Federal requirements for hazardous substances that would be legally applicable if this response were not undertaken to CERCLA Section 104. Relevant and appropriate requirements are defined as those Federal requirements that, while not applicable, are designed to apply to similar problems to those encountered at CERCLA sites being studied. Requirements may be relevant and appropriate if they would be applicable but for jurisdictional restrictions associated with the requirement. As noted above, with respect to the selection of remedial alternatives, relevant and appropriate requirements are to be afforded the same weight and consideration as applicable requirements. The following Federal and New York regulatory requirements could be potentially applicable or relevant and appropriate to the Tronic Plating Site.

1) Contaminant-Specific

Federal

- RCRA Groundwater Protection Standards (40 CFR 264, Subpart F). Latest update: 52 FR 25946, July 9, 1987.
- Safe Drinking Water Act, National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-141.16). Latest update: 52 FR 25712, July 8, 1987.
- Occupational Safety and Health Standards (OSHA) (29 CFR Part 1910). Latest update: 49 FR 5321, February 10, 1984.
- Occupational Safety and Health Standards (OSHA) (29 CFR Part 1904). Latest update: 47 FR 57702, December 28, 1982.
- Health and Safety Standards for Federal Service Contracts (29 CFR 1926). Latest update: 52 FR 46312, December 4, 1987.
- Clean Water Act (CWA), Ambient Water Quality Criteria. (45 FR 79318-79379, November 28, 1980).

State of New York

- New York State Pollutant Discharge Elimination System (SPDES) standards/limitations (Article 7 of ECL, 6 NYCRR 750-758). Latest update: July 22, 1987, effective August 22, 1987.

- o Actual standards/limitations of New York State Pollutant Discharge Elimination System (SPDES) permit (on file; previously issued to owner/operator of Tronic Plating facility).

- o New York Drinking Water Standards (Article 7 of ECL, 6 NYCRR 701.3). Latest update: July 3, 1985, effective August 3, 1985.

- o New York Groundwater Quality Standards (Article 7 of ECL, 6 NYCRR 703). Latest update: July 3, 1985, effective August 3, 1985.

2) <u>Location-Specific</u>

<u>Federal</u>

- o Safe Drinking Water Act: Sole-Source Aquifer Requirements (40 CFR 149). Latest update: 52 FR 23986, June 26, 1987.

<u>State of New York</u>

- o New York SPDES Groundwater - Effluent Standards for Nassau/Suffolk Counties. Latest update: July 3, 1985, effective August 3, 1985.

3) <u>Action-Specific</u>

<u>Federal</u>

- o DOT Hazardous Materials Regulations (49 CFR 171.1-171.500). Latest update: 51 FR 34987, October 1, 1986.

- o RCRA Surface Impoundments Standards (450 CFR 264, Subpart K). Latest update: 52 FR 25946, July 9, 1987.

- o RCRA Closure and Post-Closure Standards (40 CFR 264, Subpart G). Latest update: 52 FR 25946, July 9, 1987.

- o RCRA Landfill Standards (40 CFR 264, Subpart N). Latest update: 52 FR 25946, July 9, 1987.

- o TSCA, PCB Disposal Requirements (40 CFR 761). Latest update: 52 FR 10705, April 2, 1987.

- o Clean Water Act, as amended - NPDES permitting requirements (40 CFR 122). Latest update: 51 FR 26991, July 28, 1986.

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- o RCRA Groundwater Monitoring and Protection Standards (40 CFR 264, Subpart F). Latest update: 52 FR 25946, July 9, 1987.
- o Safe Drinking Water Act Underground Injection Control Requirements (40 CFR 146). Latest update: 49 FR 31404, July 8, 1983.
- o RCRA Subtitle C and Subtitle D, Non-Hazardous and Hazardous Waste Management Standards (40 CFR Part 257, 260-270). Latest update: 52 FR 41295, October 27, 1987.

State of New York

- o New York SPDES Discharge to Groundwater Requirements (6 NYCRR 750-758). Latest update: July 22, 1987, effective August 22, 1987.
- o New York Discharge to Surface Water Requirements (6 NYCRR 750-758). Latest update: July 22, 1987, effective August 22, 1987..
- o New York Hazardous Waste Management System Regulations (6 NYCRR 370). Latest update: May 31, 1986, effective June 31, 1986.

3.2.3.2 Requirements

When ARARs do not exist for a particular chemical or when he existing ARARs are not protective of human health or the environment, other guidance may be useful in developing a remedial alternative. These standards, criteria, advisories and guidance were developed by EPA, other Federal agencies and the State of New York. The concepts and data underlying these requirements may be used at the site in an appropriate way. The following Federal and New regulatory requirements could be considered:

1) Federal

- o Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs). Latest update: 52 FR 25712, July 8, 1987.
- o USEPA Drinking Water Health Advisories.
- o USEPA Health Effects Assessment (HEAs).
- o Cancer Assessment Group National Academy of Science Guidance.
- o TSCA Health Data.

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- Waste Load Allocation Procedures.

- Proposal Maximum Contaminant Levels (50 FR 46902-46933, November 13, 1985).

- Proposed Maximum Contaminant Level Goals (50 FR 46936-47022, November 13, 1985).

- EPA Effluent limitation Guidelines for Electroplating facilities.

- PCB Spills Cleanup Policy and PCB Recordkeeping Amendments (Notice of Proposed Rulemaking Revising 40 CFR 761, expected May, 1987) (see 52 FR 14873 April 27, 1987).

2) State of New York

No New York requirements for Tronic Plating appears to be considered at this time.

3.3 DATA QUALITY OBJECTIVES (DQO) DETERMINATION

The data quality objectives are based on the concept that different data uses may require different levels of data quality. Data quality can be defined as the degree of uncertainty in the data with respect to precision, accuracy, and completeness. The four levels of data quality are:

(1) Screening (Level 1): This provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at the site, preliminary comparison to ARAR, initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests).

(2) Field Analyses (Level 2): This provides rapid results and better quality than in Level 1. Analyses include mobile-lab generated data.

(3) Engineering (Level 3): This provides an intermediate level of data quality and is used for site characterization. Engineering analyses include mobile lab-generated data and CLP analytical lab methods (e.g., CLP-SAS with quick turnaround).

4) Confirmational (Level 4): This provides the highest level of data quality and is used for purposes of risk assessment, engineering design, and cost · recovery documentation. These analyses require full CLP analytical and data validation procedures.

Ebasco will generate confirmational level data for the Tronic Plating Site and study area. These data will be used for the purposes of conducting risk assessments, engineering design, and cost recovery. Field screening (Level I) for health and safety of work crews and the determination of field chemical parameters (i.e., pH, Eh, temperature, conductivity) will also be performed. In addition, the soil gas surveys will be performed at Level 2, for rapid data turnaround required to select samples for analysis. Lastly, the physical and chemical property analyses will be performed on soil to Level 3.

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4.0 TASK PLAN FOR REMEDIAL INVESTIGATION

The tasks for the Tronic Plating RI/FS correspond to the 12 tasks described in the EPA Guidance for RI/FS Tasks for REM III Contractors (OSWER Directive 9242.3-7). Of these 12 tasks, eight are considered part of the RI, and four are included in the FS. The order in which these tasks are presented is the general order in which they will be performed; however, since some tasks (e.g., Community Relations) occur throughout the duration of the RI/FS, the order of presentation gives only a general indication of the order the tasks will follow.

The following tasks are considered to be part of the RI:

- o Task 1-Project Planning
- o Task 2-Community Relations
- o Task 3-Field Investigation
- o Task 4-Sample Analysis/Validation
- o Task 5-Data Evaluation
- o Task 6-Risk Assessment
- o Task 7-Treatability Study/Pilot Testing
- o Task 8-Remedial Investigation Report

The following four tasks are considered to be part of the FS:

- o Task 9-Remedial Alternatives Screening
- o Task 10-Remedial Alternatives Evaluation
- o Task 11-Feasibility Study Report
- o Task 12-Post RI/FS Support

This section describes each of the eight tasks comprising the RI. Section 5.0 describes the four tasks comprising the FS.

4.1 TASK 1 - PROJECT PLANNING

This task involves several subtasks which must be performed in order to produce the project planning documents and project schedule necessary to execute the RI/FS. These subtasks include: a kick off meeting; site visits; RI/FS brainstorming sessions; the evaluation of existing data; the preliminary identification of remedial alternatives; the preparation of a preliminary risk assessment; data quality objectives determinations; the determination of Applicable or Relevant and Appropriate Regulations (ARAR); and scoping of the RI.

The preparation of the project plans for the Tronic Plating Company site includes completion of draft and final versions of the Work Plan (WP) only. At this time, USEPA expects participation by a Potentially Responsible Party (PRP). The PRP is expected to prepare the Field Operation Plan (FOP). The FOP is further divided into three plans: the Site Management Plan; the Field Sampling and Analysis Plan; and the Health and Safety Plan. The contents of these three plans are described in the following:

- The Site Management Plan (SMP) includes: a brief site description; an operations plan outlining the site team organization and responsibilities; and the field operations schedule. This plan also addresses the site security and control of access by unauthorized personnel.

- The Field Sampling and Analysis Plan (FSAP) includes: sampling and analytical objectives; the number, type, and location of all samples to be collected during the field investigation; the site-specific quality assurance requirements (which will be in accordance with the Quality Assurance Project Plan for the REM III program); the detailed procedures for field activities; and data management elements.

- The Health and Safety Plan (HASP) includes: site-specific information; a hazard assessment; training requirements; monitoring procedures for site operations; safety and disposal procedures; and other requirements in accordance with the HASP for the REM III Program.

4.2 TASK 2 - COMMUNITY RELATIONS

This task will be initiated to support EPA by implementating the Community Relations Plan which will be prepared for this Work Assignment. The REM III team is prepared to provide support in the following ways:

- preparing fact sheets;
- providing support for public meetings;
- preparing public meeting summaries; and
- preparing a responsiveness summary.

The details of the Community Relations activities proposed for the Tronic Plating Site are described in Section 6.0.

4.3 TASK 3 - FIELD INVESTIGATION

The Field Investigation will consist of the following subtasks:

- Subcontracting
- Mobilization
- Well Installation
- Subsurface Soil Sampling
- Groundwater Sampling
- Storm Drain Sampling

The Field Investigation program will generate the data needed to define the extent of contamination and to conduct the Public Health Risk Assessment and the FS.

4.3.1 Subcontracting

This subtask will be include the procurement of the subcontracts to perform the Field Investigation. Two subcontracts will be required to support the field investigation.

- o A well installation and soil boring subcontract. This contract will include well installation well development, and saturated soil sampling.
- o A surveying subcontract for surveying the locations and elevations of the monitoring wells.

4.3.2 Mobilization

This subtask will consist of field personnel orientation, equipment mobilization, and the staking of sampling locations and geophysical stations.

Each field team member will attend an orientation meeting to become familiar with the history of the site, health and safety requirements, and field procedures.

Equipment mobilization will entail the ordering, purchase, and if necessary, the fabrication of all sampling equipment needed for the field investigation. A complete inventory of available REM III equipment will be conducted and any additional equipment required will be secured.

Locations for the soil borings and groundwater monitoring wells will be staked at the start of the site operations. These locations will be measured from existing landmarks and provisions will be made to accommodate site activities currently in progress.

4.3.2.1 Geophysical Investigation

As part of the Phase I investigation, a geophysical survey will be undertaken in Pinelawn Cemetery utilizing a Geonics EM 34A to measure terrain conductivity. The geophysical survey will be conducted on three east-west survey lines with stations at 20 meter intervals along their length. The lines of survey will be established in 1000 foot increments downgradient from the Tronics Plating site (See Fig. 4-6). The study will be implemented within that section of the Pinelawn Cemetery that is bounded by

- Central Avenue on the north
- Republic Road/New Highway on the west
- Tracks of the Long Island Railroad to the south
- Wellwood Avenue on the east

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This survey will have a two fold purpose. It will:

1) define or delineate plume(s) downgradient of the Tronic Plating site within a limited sector of the Pinelawn Cemetery; and

2) indicate the most advantageous location for placement of two off site downgradient wells (Figure 4-6).

4.3.2.2 Industrial Survey

Industries located within a 1.5 mile radius of the Tronic Plating Company site will be surveyed during Phase I of the RI/FS study. The survey will examine SPEDES permits for the area to determine what industries are currently discharging to groundwater and surface water. In addition, county and state agencies will be requested to identify industries in the area which have underground tanks. The results of this survey will be mapped to show the locations of discharges and underground tanks relative to the Tronic Plating Company site. The discharge parameters will be tabulated from SPEDES permits to aid in the identification of groundwater plumes.

4.3.3 Subsurface Soil Sampling

The subsurface soil sampling is comprised of three elements:

1) subsurface borings in abandoned sanitary pits and leaching pits;

2) subsurface borings at monitoring well locations, and

3) additional borings.

Figure 4-1 identifies the location where proposed on site soil samples will be obtained on site. Table 4-1 identifies the number and types of samples which will be obtained during the field program. This table also shows the estimated number of soil samples which will be taken for chemical analysis. Soil boring samples will be obtained with split spoons using a drilling rig according to field technical guidelines for sample acquisition including (FT-6.01, Soil and Rock Borings and FT-6.02, Borehole and Sample Logging).

The objective of the soil boring program is to provide detailed geological and chemical data at the Tronic Plating Company site. All subsurface sample cores will be field screened. Each split spoon sample will be scanned by a Foxboro Organic Vapor Analyzer and an HNu Photo-ionization Analyzer for volatile components and visually for matrix anomalies such as discoloration or abrupt changes in consistency. These criteria will be used to select samples for TCL analyses, plus total metals and cyanide. Samples will not be composited over depth to prevent dilution of contaminant concentration or obscure future action items.

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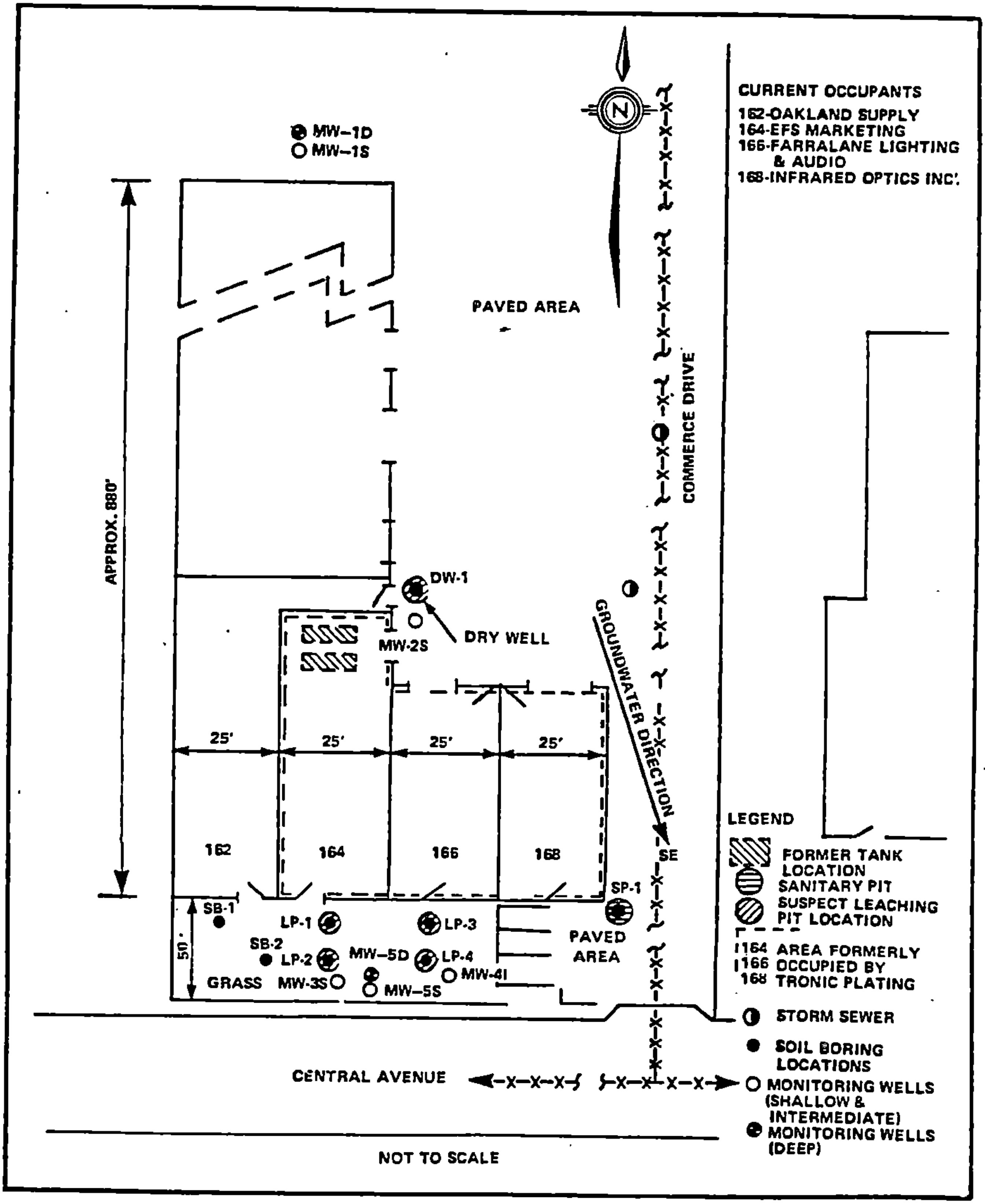
FIGURE 4-1

TRONIC PLATING SITE MONITORING WELL AND BORING LOCATION MAP



1) Subsurface Borings in Abandoned Sanitary Pit, Leaching Pits and Dry Well

Six soil borings will be advanced to the water table, one each in the sanitary pit and dry well, and one in each of the four leaching pits. These samples will show the vertical variation of subsurface contaminants at the site.

An estimated maximum of five soil samples from each of the borings described above will be analyzed for chemical parameters for a total of 30 samples. These samples will be analyzed for TCL volatile organic components (VOA), semi-volatile organic compounds and pesticides/PCB, as well as total metals and cyanide. Of the five soil sampls taken in each pit and dry well, two samples are also submitted for analyses essential to the modeling program. These tests will include leachability tests such as ASTM shaker test (ASTM reference #D3987-81), an adsorption isotherm study and a bulk density test. One shelby tube will be collected for grainsize and vertical permeabilities analyses.

2) Subsurface Borings at Monitoring Well Locations

Nine borings, seven on site and two off site (in Pinelawn Cemetery), will be converted into monitoring wells. Four of the seven on site borings will be utilized as shallow wells. These four borings will be advanced to a depth of 15 feet below the water table. An estimated five soil samples will be collected and analyzed for VOA, semi-VOA, pest/PCB, metals and CN.

Two borings will be advanced to 110 ft. below grade to provide on upgradient and one downgradient deep monitoring well. Three soil samples will be collected from each deep boring, one at the groundwater/soil interface one midway between grade and water table, and one at the bottom of the boring. These samples will be analyzed for VOA, semi-VOA, pest/PCB, metals and CN. The three soil saples taken in each of the deep borings will also be submitted for analyses required for the modeling program. These tests include leachability tests such as ASTM skaker test (ASTM Ref #D3987-81), and adsorption isotherm study and a bulk density test. One shelby tube will be collected for grainsize and vertical permeabilities analyses. One sample from each deep well will be analyzed for remedial technology parameters.

The remaining on site boring will be advanced to a depth of 80 feet below grade and will be designated the intermediate depth well. An estimated five samples will be collected for VOA, semi-VOA, pest/PCB, metals and CN analyses.

Two off site borings will be advanced to a depth of 70 feet below grade in that portion of Pinelawn Cemetery east of New Highway, west of Wellwood Avenue, south of Tronic Plating Company site and north of the tracks of the Long Island

Railroad. These borings will be designated as intermediate depth, downgradient monitoring wells. Three samples each will be collected from each of these borings and analyzed for VOA, semi-VOA, pest/PCB, metals, CN.

A total of 50 soil samples from well locations, including five duplicates will be analyzed.

The exact location of the off site wells will be based on the results of the geophysical survey (see section 4.3.2.1).

3) Additional Borings

Two additional on site soil borings, which will not be utilized for monitoring wells, will be advanced to two feet below the water table. These borings will aid in defining the lateral and vertical extent of subsurface contamination at the site. An estimated six samples will be collected from each boring for VOA, semi-VOA, pest/PCB, metals and CN analyses for a total of 12 samples. Of the six samples collected, two samples from each boring will be undergo special analyses essential for the modeing program These analyses include leachability tests such as, an adsorption isotherm study, ASTM shaker test (ASTM Ref #D3987-81), and a bulk density test. A shelby tube will also be collected for grainsize and material permeability analyses.

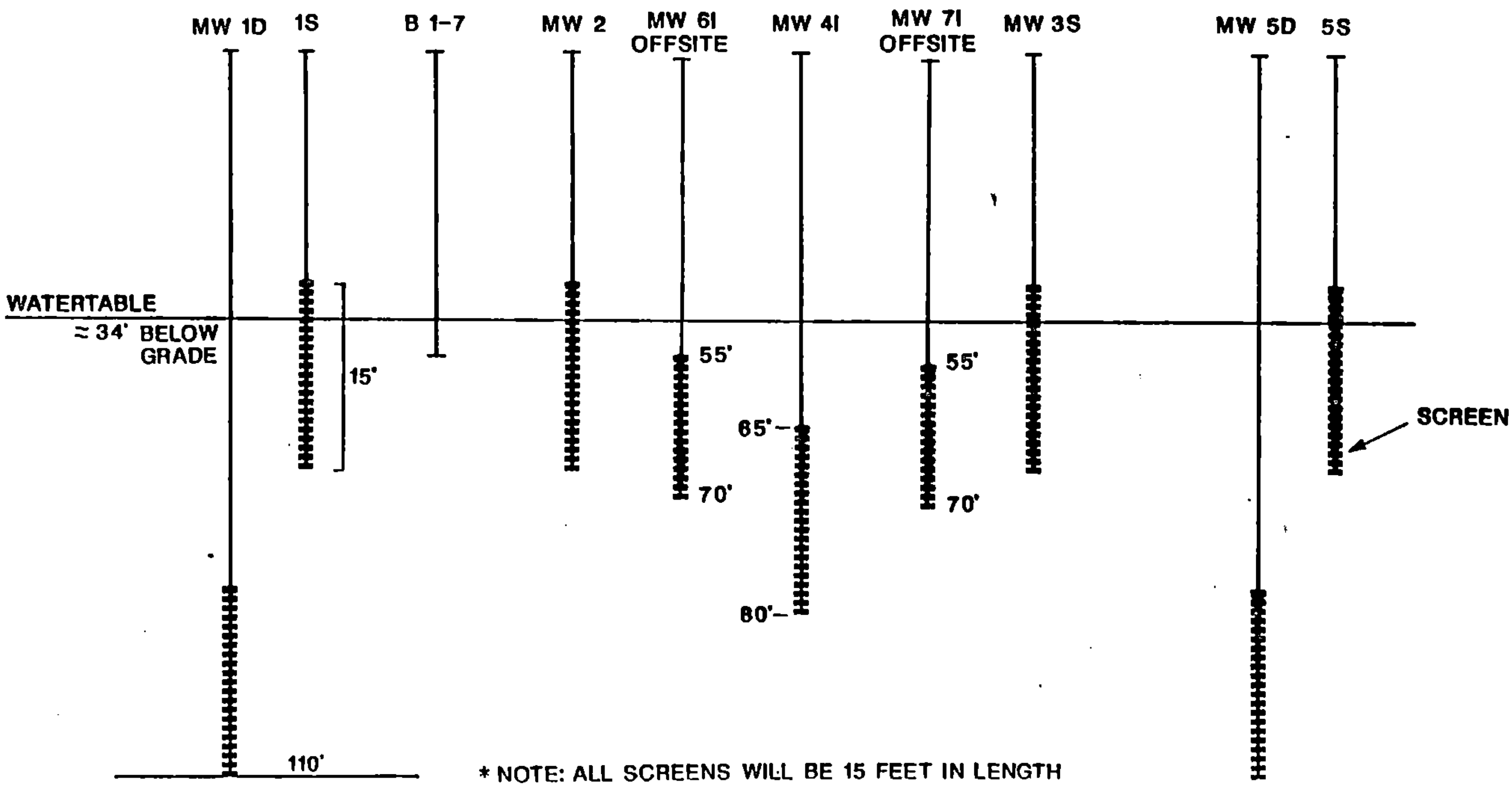
4.3.4 Monitoring Well Installation

As indicated on Figure 4-1, seven (7) monitoring wells will be installed at the Tronic Plating site. The Phase I groundwater program is designed to characterize and delineate possible contaminant transport, both vertically and horizontally, and to determine upgradient water quality parameters. Data obtained from this program will also be used to model aquifer parameters such as groundwater flow direction and permeability of subsurface stratigraphic units. Figure 4-2 summarizes the well depths and screening intervals. The typical groundwater monitoring well is shown on Figure 4-3.

Two double well clusters, each consisting of two separate wells will be installed at the Tronic Plating site. These wells will vertically characterize the water table (Upper Glacial) aquifer to the appropriate depth of the confining layer (approximately 90'-110'). The double well cluster will consist of (1) deep well and (1) shallow well; the shallow well will be screened to intercept the water table (with suitable screen length to allow for seasonal fluctuations). At each cluster location, the deep well will be installed first. Split spoon sampling in deep wells will provide the stratigraphic information needed to establish subsurface site geology.

FIGURE 4-2

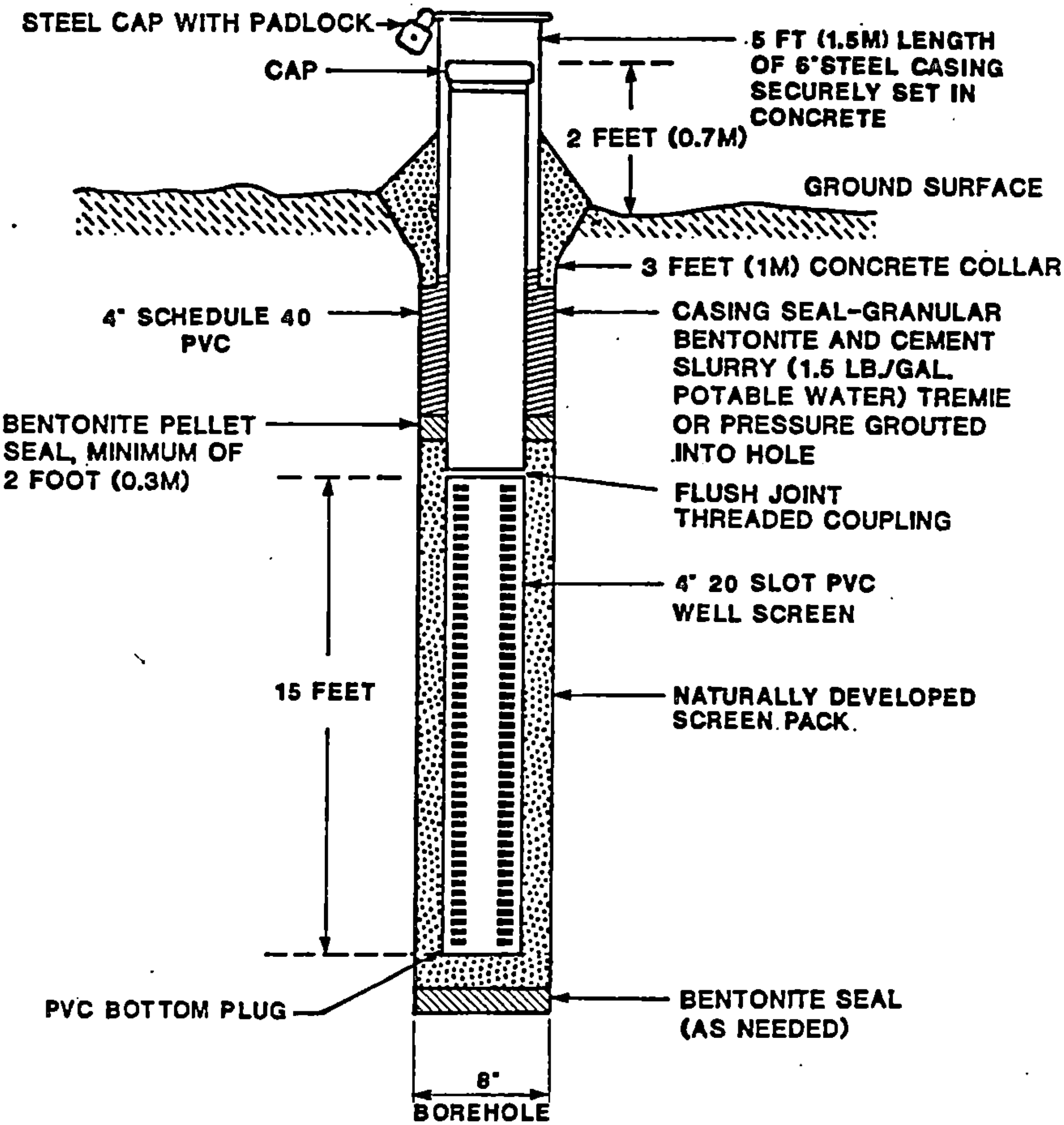
TRONIC PLATING SITE
PROPOSED MONITORING WELL
AND
BORING SCHEMATIC



* NOTE: ALL SCREENS WILL BE 15 FEET IN LENGTH

NOT TO SCALE

FIGURE 4-3
GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM



NOT TO SCALE

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Material to be used in well construction will include:

- o 8 inch bit (tricone/drag) mud rotary for deep wells;
- o 6 1/4 inch ID hollow stem auger for shallow wells;
- o 4 inch PVC, PVC screen 15 ft. in length, with .020 inch slot openings and flush joint threads, and 4-inch schedule 40 PVC riser pipe;
- o bentonite pellets;
- o cement-bentonite grout, and
- o 6-inch security casing and locks.

The shallow and deep wells will be installed in accordance with the following procedures:

(1) The site geologist will choose well depths based on the stratigraphic log developed from the deep well boring, to be screened to the approximate elevation of the confining layer;

(2) The well bore will be advanced to the chosen depth with a 6 1/4 inch I.D. hollow-stem auger or 8 inch mud rotary drill;

(3) Up to 15 feet of PVC screen will be set at the bottom of the borehole with sufficient. Screened interval will be sufficient to allow for seasonal watertable fluctuations, ± 4 feet;

(4) The annular space will be backfilled by natural packing from the bottom of the well to 2 feet above the top of the screen. A 2 ft bentonite seal will be placed on the sand and the remaining annular space will be backfilled with 3% bentonite to cement grout, placed by tremie pipe;

(5) A security casing and lock will be installed for each well, except in cases in which flushmount casings are decided upon, and

(6) A 4 square foot cement pad will be created around the security casing base and mounded in such a way as to direct surface runoff away from the casing.

The monitoring wells will not be considered complete until properly developed. Well development clears the well screen and sandpack of fine material which may clog the screen, and stabilizes the formation material immediately surrounding the well screen. The wells will be developed by pumping and surging. The surging may be done by periodically shutting off the pump, or with a surge block. This will help to avoid bridging of the formation materials and will permit a more uniform flow through the well screen.

Each well will be developed to the satisfaction of the site geologist who will monitor pumping rates, water color, turbidity, pH, and conductivity to determine the effectiveness of the development. Development will last for at least one hour, and possibly longer depending, upon site conditions. Following installation of wells in each phase, the elevations of the ground surface and the tops of the riser pipe and security casing will be surveyed. The general guidelines concerning monitoring well installation are included in FT-7.01 (Groundwater Monitoring Point Installation).

4.3.4.1 Hydrogeologic Investigation

A preliminary hydrogeological investigation to establish general groundwater flow direction within a radius of 0.75 miles of the Tronic Plating Company site (Figure 4-4) has been undertaken. Figure 4-5 illustrates the locations and indicates the well uses within the previously mentioned areal radius.

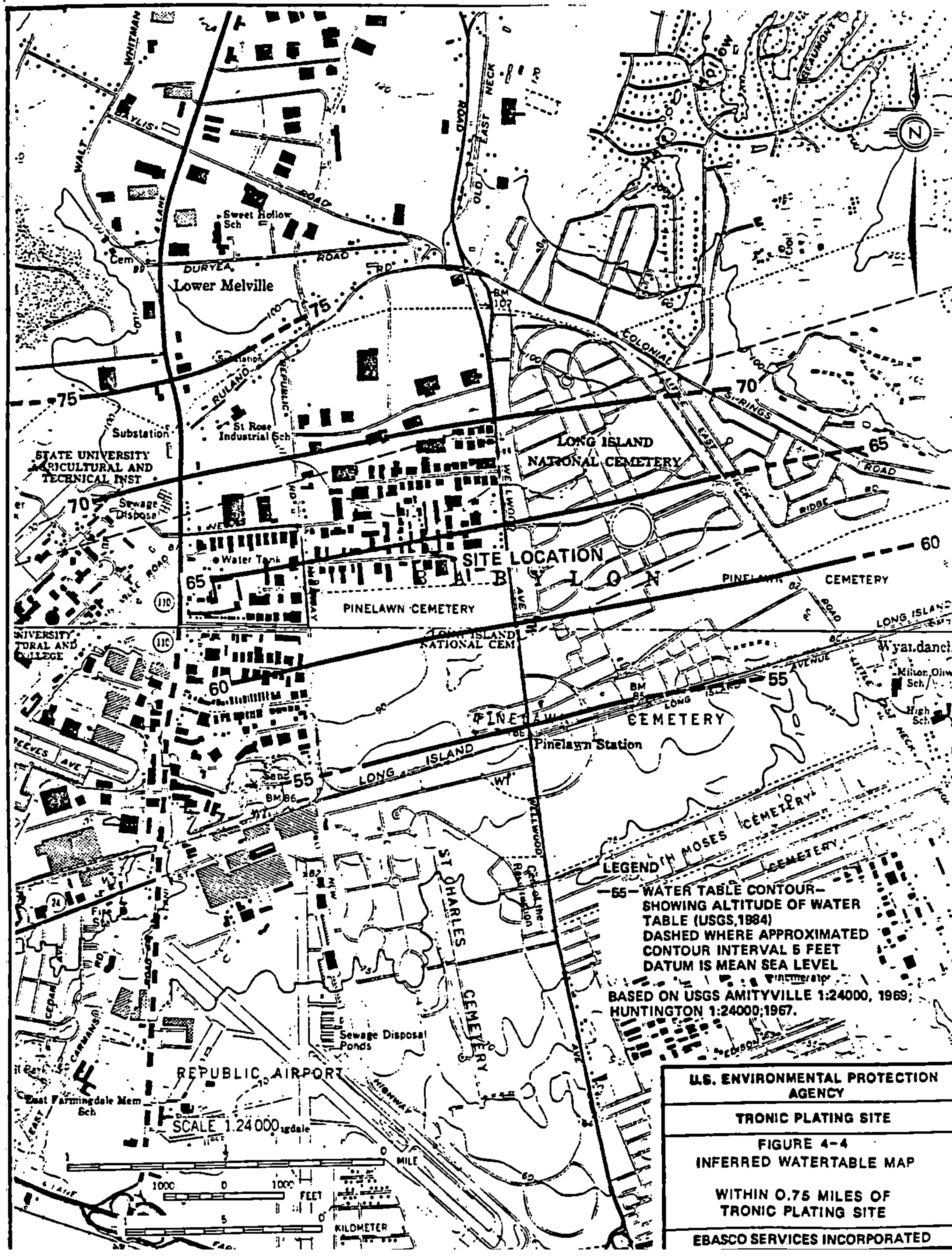
Two complete rounds of water level measurements will be made on all of the monitoring wells, before and after each round of groundwater sampling. These measurements will determine the vertical and lateral head distribution within the water table aquifer down to the confining layer, thus providing data on direction of groundwater flow from the site.

4.3.4.2 Monitoring Well Sampling

A total of 22 groundwater samples will be obtained from the monitoring wells shown in Figure 4-1. The samples will be analyzed for TCL parameters, plus total metals and cyanide, as noted on Table 4-1. In addition, two groundwater samples will be taken for remedial technology analyses (see Table 4-1, ** footnote).

The first round of groundwater samples will be taken after the last of the monitoring wells has been installed. The final well installed will be sampled last. These wells will have stabilized for approximately two weeks, after development and prior to sampling. The first wells installed will be the first sampled (these wells will have stabilized for a much longer period of time prior to the first round of sampling).

Three to five well volumes will be purged prior to sampling. The wells will not be pumped dry. PH, specific conductance, and temperature will be measured at the start of purging operations and at the end of each purged well volume. Stabilization of these parameters between successive purged volumes indicates that the groundwater within the well is at equilibrium.



U.S. ENVIRONMENTAL PROTECTION AGENCY

TRONIC PLATING SITE

FIGURE 4-4
INFERRED WATERTABLE MAP

WITHIN 0.75 MILES OF TRONIC PLATING SITE

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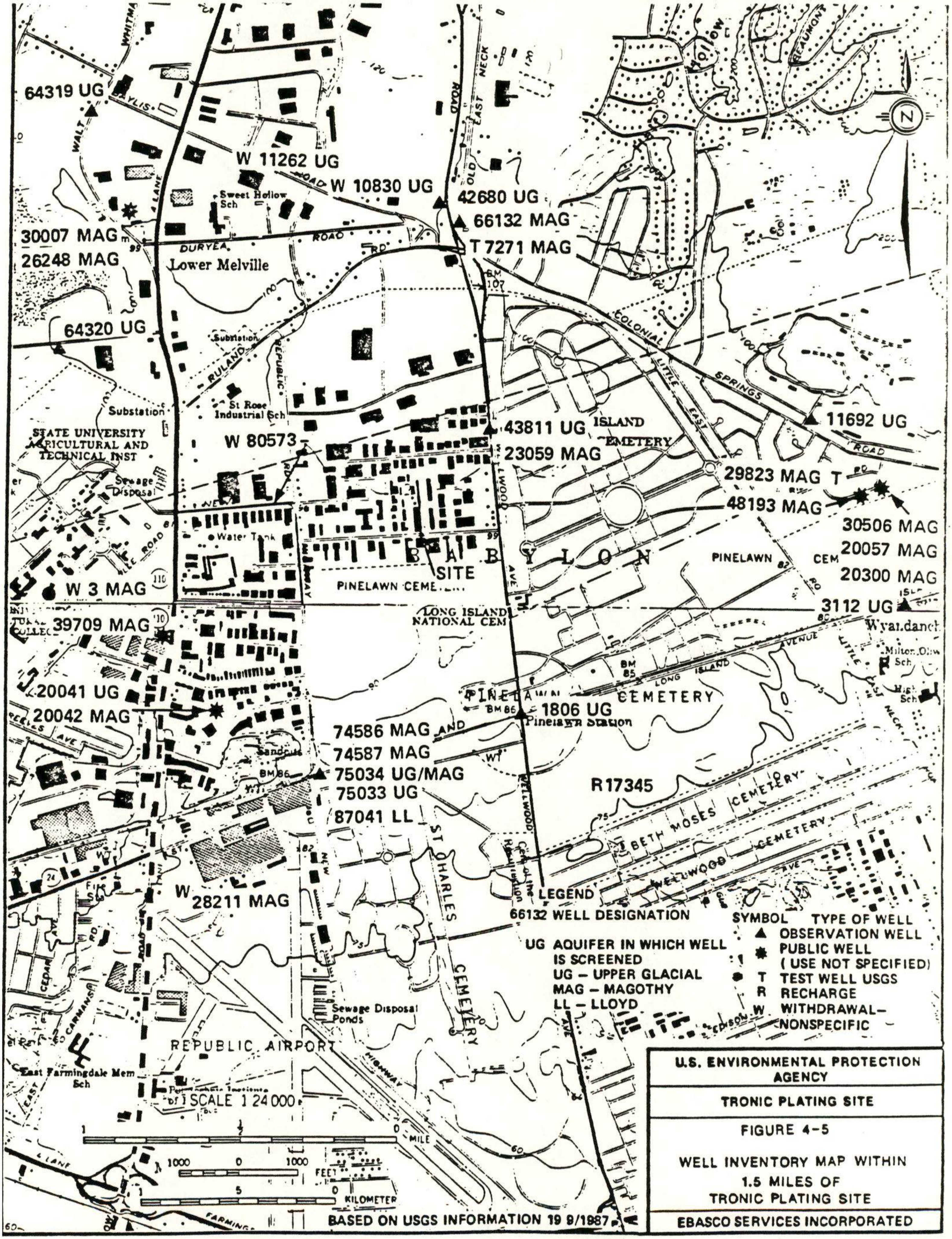

U.S. ENVIRONMENTAL PROTECTION AGENCY

TRONIC PLATING SITE

FIGURE 4-5

WELL INVENTORY MAP WITHIN 1.5 MILES OF TRONIC PLATING SITE

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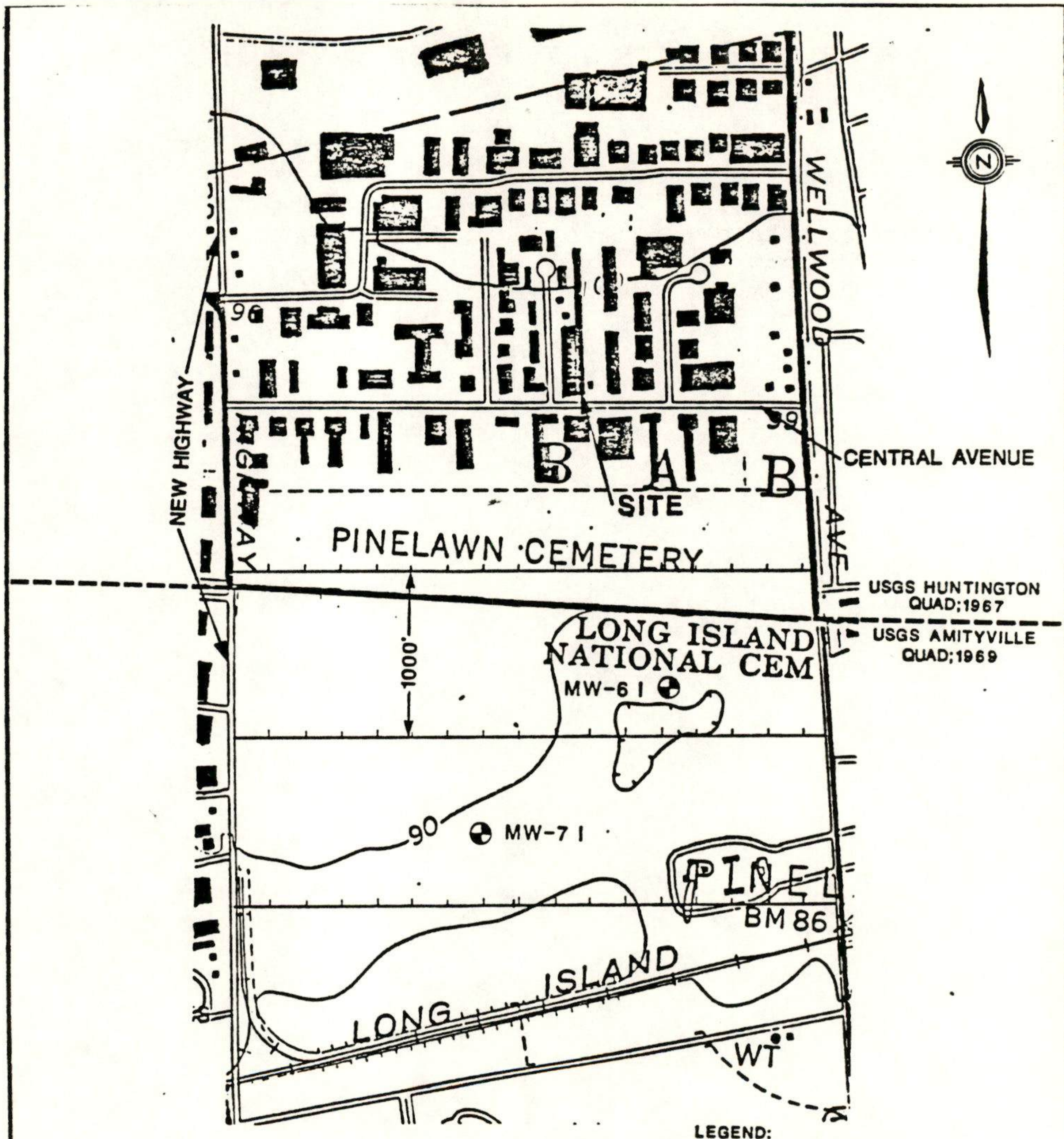
TABLE 4-1
SOIL AND GROUNDWATER
ANALYSIS SUMMARY
SOIL SAMPLES

Sample Location	SOIL SAMPLES Estimated Total Number of Samples		Complete TCL Organics, Metals & CN		WATER SAMPLES Estimated Total Number of Samples		VOA	Semi VOA	Pest/PCB	Metals Fil/Unfil		(
Onsite:												
Soil Boring 1 (SB-1)	8		2a/	6								
Soil Boring 2 (SB-2)	8		2a/	6								
Sanitary Pit 1 (SP-1)	7		2a/	5								
Leaching Pit 1 (LP-1)	7		2a/	5								
Leaching Pit 2 (LP-2)	7		2a/	5								
Leaching Pit 3 (LP-3)	7		2a/	5								
Leaching Pit 4 (LP-4)	7		2a/	5								
Dry Well 1 (DW-1)	7		2a/	5								
Monitoring Well 1s (MW-1s)	5			5	2***		2			2	2	
Monitoring Well 2s (MW-2s)	5			5	2***		2	1	1	2	2	
Monitoring Well 3s (MW-3s)	5			5	2***		2			2	2	
Monitoring Well 4i (MW-4i)	5			5	2***		2			2	2	
Monitoring Well 5s (MW-5s)	5			5	2***		2	1	1	2	2	
Monitoring Well 1d (MW-1d)	7	1*		3	3***	1**	2			2	2	
Monitoring Well 5d (MW-5d)	7	1*	3a/	3	3***	1**	2	1	1	2	2	
Duplicates	5		3a/	5	2***		2			2	2	
Storm sewers (SS-1,2)	2			2	2***		2			2	2	
Monitoring Well 6i (MW-6i)	3			3	2***		2	1	1	2	2	
Monitoring Well 7i (MW-7i)	3			3	2***		2	1	1	2	2	
Blanks:												
Field					14		14	14	14	14	14	1
Trip					12		12	12	12	12	12	1
Distilled Water					12		12	12	12	12	12	1
TOTALS	110	2*	22a/	86	62	2**	60	43	43	60	60	6

* For Evaluating Remedial Technologies: Grainsize, Organic Content, Moisture Content, Cation Exchange, Permeability, (as Shelby Tubes)
** For Evaluating Remedial Technologies Biological Oxygen Demand, Chemical Oxygen Demand, Oil and Grease Alkalinity, Bicarbonate, Carbonate, Hardness Sulfate
*** Field Analysis: pH, Temperature, Specific Conductance
a/ For Modeling Effort: Leachability, Adsorption isotherm and Bulk density.
Fil - Filtered
Unfil - Unfiltered



LEGEND:

LINES OF GEOPHYSICAL SURVEY

PROPOSED MONITORING WELL LOCATION

SCALE 1:10,000

1/2 — 0 MILE

1000 — 0 — 1000 FEET

.5 — 0 KILOMETER

U.S. ENVIRONMENTAL PROTECTION AGENCY

TRONIC PLATING SITE

FIGURE 4-6

PROPOSED GEOPHYSICAL SURVEY MAP AND DOWNGRADIENT WELL LOCATION

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Samples will be obtained with a stainless steel or a teflon bailer. Eight (8) bailers will be supplied so that a bailer can be dedicated to a given well for each day of sampling. Groundwater sample acquisition procedures are described in FT-7.02 (Groundwater Sample Acquisition).

Ebasco has designed its schedule and critical path for the RI/FS to accommodate sampling of subsurface soils and groundwater at an early stage of the field investigation. At that time, it is planned that samples would be collected for delivery to the EPA/CLP contractor laboratory. Exact logistics for this activity will be arranged prior to expected drilling and sampling, in order that the EPA/CLP contractor can be notified of samples and sampling activities.

4.3.5 Storm Drain Sampling

A total of two sediment samples and two water samples will be collected from the storm drain locations shown on Figure 4-1. The results of the analyses of these samples will be used to estimate what contaminants are or may have been introduced to the groundwater at the site from sources other than the former leaching pits.

Storm sewer sediment samples will be collected with a bottom discharge bailer. These grab samples will be analyzed for the parameters shown in Table 4-1.

4.3.6 Phase II

As noted in Sections 1.1 and 2.4 of this Work Plan, Ebasco recommends that a two-phased approach be employed to determine the nature and extent of contamination resulting from the operation of the Tronic Plating Company facility. Because off-site migration of contaminants cannot be ruled out, Ebasco believes that groundwater modeling efforts will be required at the end of Phase I (onsite studies).

4.3.6.1 Groundwater Modeling

The major objective of the Phase I effort is to determine the extent and consequences of potential contaminant plume migration from the Tronic Plating Site. To delineate a potential downgraident groundwater contaminant plume and more efficiently implement Phase II efforts, Ebasco will use computer models to characterize contaminants in soil and their interactions with groundwater at and downgradient from the Tronic Plating site. The models will take into account important aspects of aquifer interaactions with the contaminants such as retardation, adsorption, degradation and dispersion.

Ebasco will employ both a groundwater flow model and a transport model which have been successfully used in the past. The Prickett and Lonnquist flow model and the modified Rapid Assessment model for transport will initially be utilized. This initial proposal does not preclude the use of alternative models such as, CFEST, SUTRA, SWIFT or MODFLOW. However, the actual models applied to the project will be selected based on accuracy and availability of data necessary to perform the modeling. Ebasco will employ only well documented and accepted flow and transport models.

Anticipated Results from Modeling

Based on the results of the Phase I database, combined with preliminary fate and transport modeling, several important issues regarding offsite contaminant migration can be addressed:

- o Potentially immediate health risks can be more accurately defined for downgradient locations at which groundwater is utilized.
- o A basis for location and number of Phase II monitoring wells will be more readily defined.
- o FS efforts will be more effective in determining various groundwater and soil remediation alternatives.
- o In the event that no contamination is found in the groundwater during Phase I, confirmatory wells within a designated area, where a discrete contaminant plume may be present, can be located. This is particularly important if contamination is not found on site.

If Phase II work is recommended, based upon the results of Phase I and the modeling program, a Technical Direction Memorandum will be prepared and submitted to the EPA for review and approval. The effect of this Phase II work on the schedule proposed for the work specified in this Work Plan is discussed in Section 7.3.

4.4 TASK 4 - SAMPLE ANALYSIS/VALIDATION

A summary of the analytical effort is shown in Table 4-1. Section 3.2.2 lists the data quality objectives for each analysis type.

4.4.1 Soil Analysis

One hundred and five surface and subsurface soils will be sampled from 14 borings around the site. Soils will be analyzed for Target Compound List (TCL) volatile, semi-volatile compounds and pesticides/PCB's since no testing data is available for the site. (see Table 4-1.) Analysis for metals and cyanide in soils will also be performed. These compounds will be analyzed according to current CLP methodologies (CLP IFB SOW for inorganics - 9/85 and CLP IFB SOW for organics - 10/86).

4.4.2 Groundwater Analysis

Fourteen groundwater samples from the monitoring wells will be analyzed for metals, cyanide and TCL volatiles as these compounds are most likely to be used in electroplating operations. In addition, 15% of the samples will be also analyzed for semi-volatiles and pesticides, following CLP methodologies, as above, so that no contaminants will miss detection. Field measurements for ph, specific conductance and temperature will also be taken, as shown in Table 4-1.

4.4.3 Sample Tracking

Ebasco's Regional Laboratory Sample Coordinator (RLSC) will track the samples sent to CLP to assure the continuity and consistency of data and analyses throughout the sampling program. Tracking will include tabulating the date samples are obtained, dates shipped, analyses performed, holding times, dates extracted and analyzed, and dates validated. THe RLSC will notify the Site Manager in the event of problems with the sample analyses.

All sample data validation will be performed by EPA Environmental Services Division (ESD) in Edison, N.J.

4.5 TASK 5 - DATA EVALUATION

This task include the data validation effort performed by the EPA Environmental Services Division and Ebasco's data reduction and evaluation effort. Ebasco will develop the best means to organize, analyze, interpret and present the data to support the RI including:

- o geohydrological parameter determination including transmissivity, hydraulic conductivity and hydraulic gradient;
- o preparation and interpretation of well logs and definition of stratigraphy;
- o develop the relationship between deep soil contamination at the site to groundwater contaminant concentrations;
- o integrate the analytical data into site data summaries;
- o statistical and presentational elements as appropriate to develop a picture of contaminant distribution at the site.

These analyses provide information which can be incorporated in the screening of remedial alternatives and detailed evaluation of remedial alternative tasks.

4.6 TASK 6 - ASSESSMENT OF RISKS

4.6.1 Public Health Evaluation

After the site investigation information has been evaluated and the data base for the site has been established, a preliminary baseline public health evaluation will be performed for the Tronic Site. The objective of this assessment is to characterize health and environmental risks that would prevail if no further remedial action is taken.

The basic methodology to be employed is summarized in Figure 4-7. This process will be conducted in accordance with the procedures outlined in the EPA Superfund Health Evaluation Manual (EPA, 1986), based on previously gathered monitoring data which are determined usable.

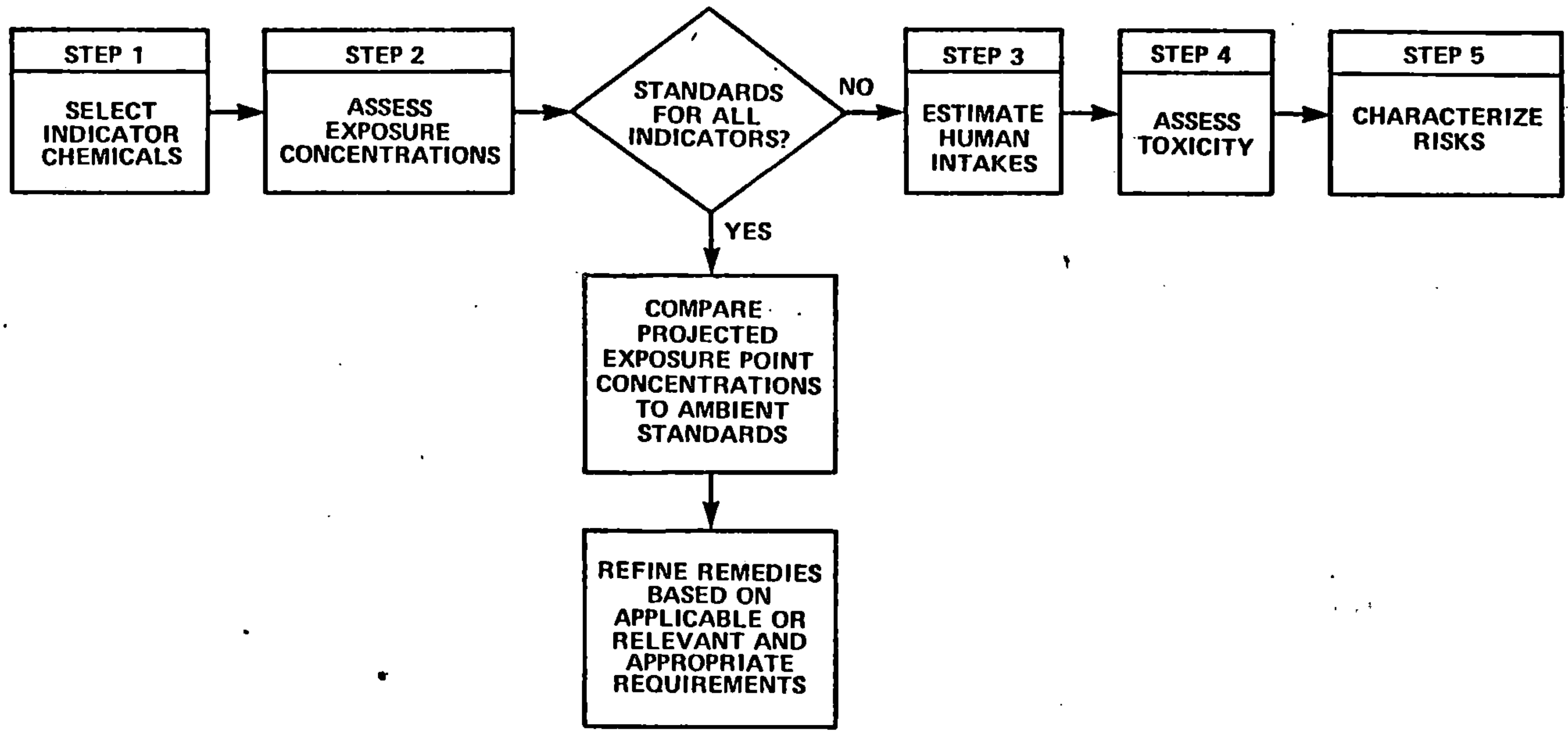
The first step is the selection of indicator chemicals for which quantitative risk analyses will be performed. Indicator chemicals will be selected based on prevalence, concentrations observed, distribution among environmental matrices, toxicity, and environmental behavior as representative of the entire spectrum of compounds found on-site.

The second step in the public health evaluation is the identification and characterization of potential exposure pathways and receptors. Given the nature of the site, primary emphasis will be placed on human exposure through consumption of contaminated groundwater.

The concentrations of the indicator chemicals in each media (groundwater and soils) at the exposure points will be estimated from the monitoring data using environmental transport and fate analyses, as appropriate. The general basis and guidelines for exposure projections will be in accordance with the Draft Superfund Exposure Assessment Manual (EPA, 1986). The observed and estimated concentrations will then be compared to applicable or relevant and appropriate standards and criteria, which are reviewed in Section 3.2.1 and which will be finalized for risk assessment. Applicable or relevant and appropriate standards may be available for all of the indicator chemicals on site. If so, no further quantitative analysis of risk will be performed. For certain pollutants and critical exposure pathways where concentrations exceed or nearly exceed standards, additional risk analysis will be performed to confirm that the pollutant transport models used adequately reflect conditions at the site and to determine where additional data are needed to characterize risks. If standards and criteria are not available for all of the indicator chemicals, quantitative analyses will

FIGURE 4-7

BASELINE PUBLIC HEALTH EVALUATION
TRONIC PLATING RI/FS WORK PLAN



be performed, following the general procedures outlined in EPA's Endangerment assessment Handbook (1985) and Superfund Public Health Evaluation Manual (1986).

For chemicals for which no applicable or relevant standards exist, acceptable concentrations in environmental media will be developed based on Acceptable Daily Intakes (for non-carcinogens) and on target risk levels (for carcinogens). The primary sources of toxicological data used in this analysis will be Appendix C of the Superfund Public Health Assessment Manual (1986), EPA's Health Effects Assessments (HEAs) and EPA's Air and Water Quality Criteria Documents. Target risk levels for carcinogens will be selected after consultation with EPA and EPA will also be notified if it is felt that there are good technical reasons for selecting toxicity value other than those found in the references cited above. In addition, using the reference cited, a summary toxicity profile will be developed for each indicator chemical. This toxicity profile will summarize pertinent information regarding the chemical based on EPA contaminant profiles, health effects advisories, and water quality criteria support documents.

This assessment will define the exposures and levels of risk to human health associated with soils and groundwater present at Tronic Plating Site. The results can also be used to estimate the risk associated with any remedial activity proposed for the site.

4.7 TASK 7 - TREATABILITY STUDY/PILOT TESTING

The preliminary scoping of remedial alternatives (Subsection 3.1.3) considered certain developed and innovative technologies for treatment of the contaminated soil and groundwater at the site. Assuming that some of these technologies meet remedial response objectives and that they pass the initial screening, treatability studies (laboratory or field) would be needed to evaluate their applicability to the site and to develop cost information for economical comparison among the technologies.

However, in this Work Plan, no specific treatability studies are proposed because of the following reasons:

- o due to the limited historical data, site-related contaminants of concern are not fully known;
- o the extent of contamination at the site is unknown. There is a possibility that contamination may have migrated offsite;
- o the ambient groundwater quality at the site is not known. This information would be of concern if a pumping and treatment alternative is considered for cleaning up contaminated groundwater at the site, and

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- conducting treatability studies for certain technologies can be costly. Therefore, treatability studies should not be conducted for those technologies which cannot pass the initial screening.

Therefore, it is proposed that in the initial screening meeting with EPA, Ebasco will also discuss the need and suggested scope of the treatability studies to be performed. With EPA's concurrence, Ebasco will submit, in ten calendar days, a written proposal (including scope of work, budget and schedule) on the treatability study to EPA for approval. In the same time, Ebasco will also commence preparing and issuing necessary bid packabes for selecting qualified testing facilities to perform the treatability tests.

4.8 TASK 8 - REMEDIAL INVESTIGATION REPORT

The RI report will summarize the data collected and the conclusions drawn from the investigative areas, and will include the following information:

- an updated site description;
- site maps;
- field investigation results;
- results of the geohydrological modeling effort;
- chemical analyses results;
- results of the risk assessment, and
- treatability study/pilot scale testing results (if any).

Project status meetings are scheduled as part of Task 8 following EPA review of the RI report.

5.0 TASK PLAN FOR FEASIBILITY STUDY

The Feasibility Study (FS) for The Tronic Plating Company Site will consist of the following four tasks:

- o Task 9 - Remedial Alternatives Screening
- o Task 10 - Detailed Evaluation of Remedial Alternatives
- o Task 11 - Preparation of Feasibility Study Report
- o Task 12 - Post Remedial Investigation/Feasibility Study Support

This study will be preceded by the initial remedial alternatives identification step (included in this Work Plan), as well as performance of bench scale treatability studies and preliminary screening of alternatives based thereon. Those efforts, as well as results of the Remedial Investigation (RI) will facilitate FS initiation parallel to completion of the RI report.

5.1 TASK 9 - REMEDIAL ALTERNATIVES SCREENING

Based on the results of the risk analysis and the established remedial response objectives, the initial screening of remedial alternatives will be performed consisting of six steps as recommended in the EPA's "Guidance on Feasibility Studies under CERCLA", and Porter's (1986) "Interim Guidance on Superfund Selection of Remedy".

In the latter guidance memorandum, development of alternatives is initiated in a "Phase I FS" which is performed concurrent with (or preceeding) the RI. This Work Plan includes a preliminary identification and discussion of such alternatives, although the process of identifying and screening potential alternatives will occur throughout the RI, as new technological and/or site-specific data emerge. Interim guidance concerning "Phase II FS", initial screening, is reflected in Ebasco's task-activity decision points at the conclusion of the RI (Section 7.3).

A list of general response actions which address remedial response objectives and site-specific conditions will be identified and developed as the RI/FS proceeds, as described below.

5.1.1 Development of Remedial Response Objectives and Response Actions

Site-specific problems requiring remediation at the site will be based on the public health risk assessment and environmental assessment, which will identify the potential exposure pathways of contaminants. The remedial response objectives will be established on the results of sampling, risk analysis, institutional requirements and community relations. Based on the site problems and the remedial objectives, the potential remedial response actions will be developed.

5.1.2 Identification of Applicable Technologies and Development of Alternatives

A preliminary portion of this task has been completed and the results can be found in Section 3.1.3 - Scoping of Remedial Alternatives. However, this preliminary identification will be finalized based on the results of the RI and the remedial response objectives. A revised list of potential remedial alternatives will be developed.

5.1.3 Screening of Remedial Technologies/Alternatives

The list of potential remedial alternatives developed above will be screened. The objectives of this effort are to eliminate alternatives principally on the basis of effectiveness and implementability. Cost, as indicated in Porter's (1986) memo, plays little or no role in initial screening unless the last criterion presented below clearly applies. Alternatives will be eliminated, as described in the NCP Section 300.68 (g), that:

- May have significant adverse impact during implementation;
- Do not adequately protect the environment and public health;
- Have technical feasibility which is either difficult or not proven; and
- Have costs an order of magnitude greater than other alternative(s) but do not provide greater environmental or public health benefits or greater reliability.

The Superfund Amendments and Reauthorization Act (SARA) addresses cleanup standards for Superfund remedial actions and requires that the selected remedy utilize permanent solutions and alternative treatment technologies, or resource recovery technologies to the maximum extent practicable. In addition, SARA requires that volume reduction of waste and contaminated soil should be considered distinctly from reducing toxicity and/or mobility. These applicable provisions of SARA will be applied during the screening of remedial technologies and alternatives.

According to the NCP screening criteria and SARA requirements, the initial screening of remedial alternatives will utilize a pass/fail score based on the following screening factors:

Engineering Practices Screening

The overall reliability and implementability of components of the alternatives, as well as complete alternatives, will be assessed. The scientific, engineering and construction judgement of Ebasco will be utilized, along with published information and other sources, to make these evaluations.

Environmental Impact Screening

Alternatives passing the first screening phase will be evaluated for impacts on the environment and on public health. The evaluation process will include environmental impacts during and following implementation. The degree of achievement of adequate control of the source waste material relative to the environment and public health for source control remedial actions will be assessed.

Institutional factors will be considered as part of this factor. Included will be on-site and off-site permit and regulatory requirements; worker safety and health requirements; and other federal, state and local regulatory requirements.

Cost Evaluation Screening

Conceptual cost estimates (order of magnitude) which have an accuracy of + 100% to - 50% will be used for cost evaluation. These estimates are normally used to roughly determine economic feasibility for comparative purposes, where alternative schemes can be priced to eliminate clearly inferior options.

For capital costs, Ebasco will use published cost information such as the "Remedial Action Cost Compendium" and its in-house files, adjusted to site-specific conditions. Operation and maintenance (O&M) cost estimates will be based on published information, overall discount rate percentages and other quick methods. When phasing of operable units and extended O&M costs are forecast, discounting of all expenditures to present worth value will be performed, using historical trends of interest rates (standard practice for Superfund sites has been 10%).

5.2 TASK 10 - DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

The remedial alternatives which pass the initial screening will be further evaluated and compared. The evaluation will conform to the requirements of the NCP, in particular, Section 300.68 (h), Subpart F, and will consist of a technical, environmental and cost evaluation as well as analysis of other factors, as appropriate. As specified in the EPA Guidance on Feasibility Studies under CERCLA, the processes of detailed evaluation include:

- o technical evaluation;
- o public health evaluation;
- o environmental assessment;
- o institutional requirements;
- o cost analysis, and
- o evaluation summary.

5.2.1 Technical Evaluation

The technical evaluation analyzes each of alternative for performance, reliability and implementability. Safety considerations are also reviewed. The performance of each alternative will be evaluated based on: (a) its effectiveness in accomplishing the response and cleanup objective; (b) its durability in maintaining the designated level of effectiveness, and (c) resources required to refurbish any of its short-life components.

The reliability components focus on the evaluation of previous technology applications, and analyze the probability for failure. Unique features of the application are compared with site-specific features. Both on-site and off-site factors are evaluated. Also evaluated are operation and maintenance requirements, whether they are simple or complex, and whether sophisticated and well-trained operators and maintenance people are required. The intensiveness of alternatives in terms of labor and material for O&M is another important evaluation criterion.

Criteria included in the implementability evaluation covers ease of installation, time of installation, monitoring requirements, potential for phasing, as related to site and external conditions and availability of sources. The time to achieve beneficial results is also included in this evaluation.

Finally, the risks to workers and residents of loss and injury during implementation of the remedial alternative and upon its possible failure are considered. The safety evaluation will include both short-term and long-term occupational health impacts.

5.2.2 Public Health Evaluation

The public health evaluation will be based on the level of hazard posed by implementing each remedial alternative and assessing how well each alternative satisfies the established health objectives. Each alternative will be evaluated with regard to its impacts on present and possible future public health risks at the site. This evaluation will be built around acceptable pollutant concentrations in environmental media developed in the baseline risk analysis. For non-carcinogens, changes in exposure levels will be noted and concentrations still exceeding chronic and subchronic acceptable levels will be identified. For carcinogenic pollutants, an assessment will determine whether the remedial alternative under analysis reduces the exposure levels below those corresponding to the target risk levels specified by EPA.

5.2.3 Environmental Assessment

The environmental assessment evaluation analyzes the alternatives for their "net" effect on the on-site and off-site environment. The environmental assessment will define the beneficial effects and adverse effects that a remedial alternative may have on the environment. Accordingly, each alternative will be compared with existing ambient concentration standards and criteria, impact on sensitive environments, effect on human resource use pattern, time frame of the effects, and technology failure scenario.

5.2.4 Institutional Requirements

The institutional evaluation analyzes the alternatives for their effectiveness in compliance with institutional requirements, restrictions, permitting and other recommended procedures; and in terms of community relations. The current EPA policy on the use of applicable and relevant standards and other criteria, guidance, and advisories will be defined for the site and evaluated relative to conformance for each remedial alternative. The NCP, CERCLA and SARA compliance policies are defined as "applicable requirements". EPA policy on institutional requirements calls for primary consideration of Federal environmental and public health standards and secondary consideration of State and local standards in selecting remedial actions. These evaluations will be measured in terms of procedual simplicity or complexity, timing, standards and potential acceptability. The public perception and receptiveness to each alternative also will be assessed and measured.

5.2.5 Cost Evaluation

The cost effectiveness of each alternative will be measured by estimating its capital and annual operation/maintenance costs, the sensitivity of the cost estimates and the present worth value. The detailed cost analysis will be performed as

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specified in the EPA Guidance on Feasibility Studies under CERCLA and will consist of the following steps:

- o Estimate capital and operation and maintenance costs;
- o Calculate annual cost and present worth; and
- o Evaluate the sensitivity of cost estimates.

Total capital costs include both direct capital costs and indirect capital costs. The major direct capital costs are estimated based on the facilities, equipment and construction features. Material quantities, labor, equipment, and installation costs for each alternative are estimated on the basis of available sources and local wage rates. The indirect capital costs include emergency, legal and administration fees and contingency allowances. Operational and maintenance costs will be determined from estimates of labor and material. Maintenance costs will be calculated as a percentage of the direct construction costs on the basis of experience. The cost estimates are accurate to within -30% to +50% of the final project costs as per the EPA Guidance Document.

The present worth values will be used for cost comparison among the alternatives. Annual running costs will be converted and presented as a present worth capital expenditure. Similarly, cost of remedial action alternatives or phases thereof, occurring over different time periods will be converted to present worth value. Discount rates will be estimated in accordance with current market values. Finally, a sensitivity analysis will be conducted for factors that could affect the overall costs of the remedial action.

5.2.6 Evaluation Summary

Pertinent information on the evaluation criteria will be summarized for each alternative including the no-action alternative to enable the decision maker to determine the preferred alternative in terms of cost and effectiveness. The evaluation summary will include the various effectiveness criteria considered in the detailed evaluation.

5.3 TASK 11 PREPARATION OF FEASIBILITY STUDY REPORT

A FS report will be prepared to summarize the activities performed and to present the results and associated conclusions of Tasks 1 through 10. The report will include a summary of laboratory treatability findings, a description of the initial screening process and the detailed technical, environmental, regulatory, public health and cost evaluation of the remedial alternatives studied. The FS report will be prepared and presented in the format specified in the EPA Guidance on Feasibility Studies under CERCLA (EPA's FS Guidance):

This effort includes preparation of the Executive Summary, Introduction and Summary of Alternatives according to Section 9.1, 9.2 and 9.6 respectively, of the EPA's FS Guidance. The executive summary will be a brief overview of the study and the analysis underlying the evaluated remedial actions. The introduction to the FS Report will briefly characterize the site in terms relevant to the analysis of remedial action strategies in three subsections: (1) site background information; (2) the nature and extent of contamination problems; and (3) objective of remedial action. The practicable remedial alternatives will be summerized and the results of the detailed evaluation will be presented using tables and figures.

The screening process used to identify the feasible remedial alternatives for the site to undergo subsequent detailed evaluation will be presented in two subsections. The first subsection will present the feasible technologies identified for the general response actions, the technical criteria including site and waste characteristics that were used in the technology selection process, and results of the remedial technology screening as described in Section 2.3 of the EPA's FS Guidance. The second subsection will present the remedial alternatives developed by combining the technologies identified in the previous screening process, in the five required categories (off-site disposal, attain ARAR's, exceed ARAR's, do not attain ARAR's and no action) as specified in Section of 2.4 of the EPA's FS Guidance. This subsection will also describe the initial screening.

The details of the cost and non-cost features of each alternative will be presented. A description of the detailed evaluation process and results conducted in Task 10 will also be presented. The cost and non-cost criteria and analyses of the alternative will be presented in five categories: (1) Technical Feasibility, (2) Public Health Requirements; (3) Environmental Impacts, (4) Institutional Requirements, and (5) Cost Analysis. Ebasco's FS Report will clearly establish the bases for EPA to select the preferred remedial alternative.

5.4 TASK 12 - POST REMEDIAL INVESTIGATION/FEASIBILITY STUDY SUPPORT

Ebasco will provide EPA with any support requested for activities which occur after the Tronic Plating Company Site RI/FS is completed, over and above that funded in Task 2. The scope and budget estimated for this effort, if needed, will be determined in meetings with EPA after the RI/FS report is approved and follow-up actions are identified.

As part of Task 12, Post RI/FS Support, REM III CR Staff will prepare a Draft and Final Responsiveness Summary for the Public Comment Period on the FS. The Responsiveness Summary will provide a record for the EPA of all issues identified during the public comment period and public meeting on the FS report. The REM III community relations staff will assist the technical team in responding to written comments and will produce a responsiveness summary of the major concerns identified at the FS public meeting and during the public comment period.

6.0 TASK PLAN FOR COMMUNITY RELATIONS (Continuation of Task 2)

This scope of work for the site responds to EPA's request for continued Community Relations Implementation (CRI) support during the ongoing RI/FS. The REM III Community Relations Staff will assist EPA in preparing and implementing a community relations plan. This assistance will be provided as specifically requested by the EPA and is expected to include the following:

- o Preparation of two updates during the (RI/FS). One update will be prepared during the RI and a second update will be completed following the release of the FS report.

- o Update the mailing list for this site.

- o Coordination of property access for the RI/FS field activities. During the RI, the EPA and REM III staff expect to conduct sampling of off-site areas that include private properties. At the request of the EPA, REM III community relations staff will assist EPA with obtaining access to private properties for sampling purposes and informing property owners about the purpose and test results of the sampling. This may include:

  - o Developing local business across permission forms;

  - o Contacting local businesses to obtain completed permission forms, allowing EPA access to commercial properties;

  - o Scheduling appointments for REM III contractors with local businesses as needed; and

  - o Providing follow-up telephone calls to local businesses to ensure that the sampling was completed and to respond to any questions residents may have regarding EPA activities.

- o Assistance to EPA with planning and implementation of two informal public availability sessions or small group meetings. REM III community relations, will assist EPA at public availability sessions or small group meetings throughout the RI/FS field activities. The purpose of these sessions is to answer specific questions from residents. REM III community relations staff will provide the following support:

  - Arrange for public availability sessions locations and room set up;

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- Provide information to EPA personnel about possible questions, issues and concerns citizens have about the project;

- Attend public availability sessions/meetings; and

- Provide a summary report of issues identified during public availability sessions with an action list for appropriate EPA follow-up.

o <u>Providing public meeting support for public meetings and prepare one public meeting summary.</u> REM III community relations staff will provide logistical support and attend meetings on the RI/FS. A public meeting summary for the RI/FS will be prepared. A responsiveness summary of the RI/FS meeting will be prepared under Task 12.

o <u>Provide coordination, planning, and management support.</u> REM III community relations staff will provide general planning, management, analytical, and coordination support to EPA and REM III technical staff during the community relations activities at the request of the Site Manager.

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7.0 PROJECT MANAGEMENT APPROACH

7.1 ORGANIZATION AND APPROACH

The proposed project organization is shown on Figure 7-1. The Regional Manager (RM), Dr. Dev R. Sachdev is responsible for the quality of all REM III work performed in Regional II. He monitors the progress of each work assignment to ensure adequate resources are available and that major problems are prevented or minimized. Dr. Sachdev implements the program standard of quality for work in the region and makes sure that the Site Manager meets that standard. The RM's review concentrates on the technical quality, schedule, and cost for all work assignments.

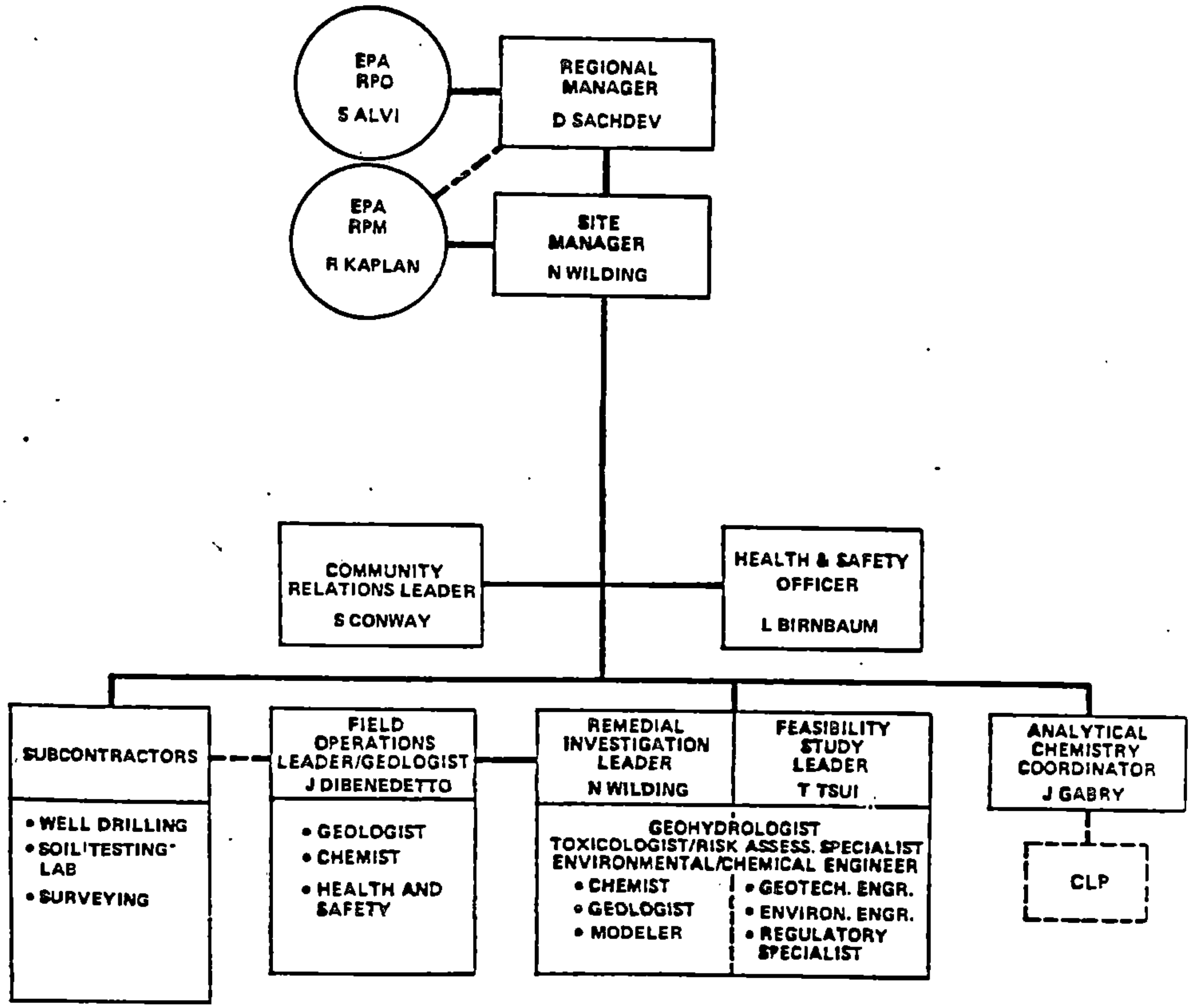
The Site Manager (SM), Mr. Neil J. Wilding, has primary responsibility and authority for implementing and executing the RI/FS. Supporting the SM are the Field Operations Leader (FOL), RI Leader, FS Leader, and other staff. The FOL is responsible for on-site management for the duration of all activities at the site. The RI Leader is responsible for the RI and for the preparation of the RI Report. The FS Leader is responsible for the FS and for the preparation of the FS Report.

The task numbering system for the RI/FS effort is a continuation of the task numbering system used for the initial tasks and activities described in the Work Plan. The Tasks are numbered as follows:

- Task 1 Project Planning
- Task 2 Community Relations
- Task 3 Field Investigation
- Task 4 Sample Analyses/Validation
- Task 5 Data Evaluation
- Task 6 Risk Assessment
- Task 7 Treatability Study/Pilot Testing
- Task 8 Preparation of Remedial Investigation Report
- Task 9 Remedial Alternatives Screening
- Task 10 Detailed Evaluation of Remedial Alternatives
- Task 11 Preparation of Feasibility Study Report
- Task 12 Post RI/FS Support

FIGURE 7-1

TRONIC PLATING CORPORATION SITE PROJECT ORGANIZATION



The task list, in addition to a project schedule and budget, comprises the baseline plans which form an integrated management information system against which work assignment progress can be measured. The baseline plans are a precise description of how the Work Assignment will be executed in terms of work scope, schedule, staffing and cost. The project schedule and the detailed cost estimate are presented in Sections 7.3 and 7.4, respectively.

7.2 QUALITY ASSURANCE AND DATA MANAGEMENT

The site specific quality assurance requirements will be in accordance with the Quality Assurance Project Plan for the REM III Program, as approved by EPA, and in accordance with the Brossman Guidance.

Data Management aspects of the program pertain to controlling and filing documents. Ebasco has developed a program filing system (Administrative Guideline Number PA-5) that conforms to the requirements of the Environmental Protection Agency and the REM III Program to ensure that the documents are properly stored and filed. This guideline will be implemented to control and file all documents associated with the Tronic Plating Corporation Site RI/FS. The system includes document receipt control procedures, a file review and inspection system, and security measures.

7.3 PROJECT SCHEDULE

The project schedule and critical path are shown on Figure 7-2 (in the pocket at the end of this Work Plan). This figure also shows the tasks and activities for the RI/FS. The critical path has been highlighted and key milestone dates have been identified.

The schedule assumes ready access to the site and that surrounding property owners (for the drilling of monitoring wells and boreholes, and the collection of samples) will not delay access to the site. The schedule also assumes that the health and safety personnel protective requirements are Level D.

The schedule for the RI/FS is based on the conditions discussed in the Work Plan. It should be mentioned that if Phase II work would have to be performed, the schedule shown on Figure 7-2 could be changed depending upon whether the site and the contaminant plume would be considered by the EPA as two separate operable units. If they are considered as two separate operable units, the schedule shown on Figure 7-2 is still valid for the RI/FS of the site. Otherwise, the schedule must be revised to include Phase II work at the conclusion of Phase I RI and groundwater modeling effort discussed in Section 4.3.6.

7.4 ESTIMATED PROJECT COSTS

The estimated cost for the site RI/FS is $________. These costs do not include the cost for any Phase II work or for the CLP analyses. These costs include all workhours, other direct costs and subcontract costs for the initial tasks and the tasks described in this Work Plan. it should be mentioned that, the estimated costs for groundwater modeling effort and treatability studies are preliminary and will be finalized following availability of requisite information. For groundwater modeling effort, a lump sum provision of $ has been made, and for the treatability studies, a provision of $_______ has been made. Both of these costs include fees.

The cost estimate is based on the assumption that health and safety personnel protective equipment requirements are Level D. If the level of protection has to be upgraded, increased costs will be incurred. Costs associated with the implementation of the Community Relations Plan have been included in the amount of $_____.

Tabulations of the estimated hours for the RI/FS by labor category apportioned by task are shown on Table 7-1. The estimated dollar costs for the RI/FS broken down by task as well as by labor, travel, equipment, computers, reports, miscellaneous and subcontractors are shown on Table 7-2. These tables are provided under separate cover with the Optional Form 60.

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