Site: Iron Horse Park
Break: 23
Other:

ENVIRONMENTAL MONITORING AND ANALYSES

IRON HORSE PARK

ASBESTOS LANDFILL PROJECT

BILLERICA, MASSACHUSETTS

August - September, 1984

Prepared for: O.H. Materials Co.
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Report Date: October 26, 1984

SEMS Doc ID 635220

Executive Summary

The Iron Horse Park Asbestos Landfill has been capped to prevent the release of potentially hazardous asbestos fibers into the atmosphere.

W. Bruce Hunter Associates, Inc., Lincoln, MA performed sampling and analytical work to characterize the site. Hunter Associates also developed and carried out an air monitoring program during the capping operation. This report presents a summary of the work performed.

The presence of asbestos-containing materials was confirmed over a large portion of the 17 acre site. The material was found under as much as 30 inches of soil cover to being exposed on the surface.

No significantly high airborne asbestos fiber levels were monitored on or off site throughout the project. Air samples collected on and off site following capping of the site with clean fill showed airborne asbestiform fiber levels equal to initial background levels.

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Glossary

Appendix

I Letters of Transmittal for Original Project Information

II Chronological Summary of Air Samples Collected

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Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 5, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
4	10:06	13:01	1.6	280	<0.005
10	09:38	12:04	1.6	234	<0.005
14	09:44	12:22	1.6	253	<0.005
18	09:58	12:45	1.6	267	<0.005
Gate			3.0	420	<0.005

Afternoon Stations	On	Time Off	Flow Time (Lpm)	Sample Rate Volume (L)	Fiber Concentration (fibers/cc)
2	12:51	15:58	1.6	300	<0.005
5	13:06	16:05	1.6	290	<0.005
12	12:15	15:43	1.6	332	<0.005
15	12:28	15:48	1.6	320	<0.005
Gate			3.0	548	0.005

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 6, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3			3.0	727	<0.005
6			3.0	884	<0.005
9	07:20	11:56	1.6	442	<0.005
12	07:27	12:07	1.6	448	<0.005
15					VOID*
18	07:44	12:34	1.6	464	<0.005
Gate			3.0	570	0.005

Afternoon Stations	On	Time Off	Flow Time (Lpm)	Sample Rate Volume (L)	Fiber Concentration (fibers/cc)
1	12:39	15:38	1.6	286	<0.005
4			3.0	168	<0.005
7			3.0	168	<0.005
10	12:05	15:18	1.6	309	<0.005
13	12:13	15:24	1.6	302	<0.005
16	12:27	15:29	1.6	291	<0.005
Gate			3.0	540	0.005

* Sample pump stolen from station

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 7, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	08:18	12:05	1.6	362	<0.005
5					VOID*
8			3.0	221	<0.005
11	07:47	11:30	1.6	357	<0.005
14	07:55	11:37	1.6	334	<0.005
17	08:01	11:45	1.6	358	<0.005
Gate			3.0	420	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	12:09	14:42	1.6	341	<0.005
6			3.0	647	<0.005
9			3.0	725	<0.005
12	11:35	14:31	1.6	378	<0.005
15	11:42	14:35	1.6	373	<0.005
18					VOID*
Gate			3.0	514	0.014

* Sample pump malfunction

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 8, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	08:57	11:49	1.6	275	<0.005
4			3.0	527	<0.005
7	09:07	12:07	3.5	540	<0.005
10	08:27	11:22	3.5	525	<0.005
13	08:39	11:26	1.6	266	<0.005
16	08:44	11:35	1.6	274	<0.005
Gate			3.0	540	0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	11:54	16:29	1.6	438	<0.005
5	11:44	16:14	3.5	945	<0.005
8	11:10	14:10	3.5	630	<0.005
11	11:20	14:20	3.5	630	<0.005
14	11:32	16:10	1.6	444	<0.005
17					VOID*
Gate	12:48	15:30	1.6	259	0.008

* Sample pump tampered with during sample period

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 10, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3					VOID*
6	08:55	11:36	1.6	258	<0.005
9			3.0	564	<0.005
12	08:13	11:18	1.6	296	<0.005
15	08:22	11:21	4.2	752	<0.005
18	08:39	11:29	4.2	714	<0.005
Gate			3.0	360	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1					VOID*
4	13:02	16:36	1.6	342	<0.005
7			3.0	261	<0.005
10			3.0	177	<0.005
13	12:39	16:23	1.6	358	<0.005
16			3.0	672	<0.005
Gate			3.0	337	0.039

* Sample pump malfunction

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 11, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	08:52	11:16	3.9	562	<0.005
5	09:01	11:22	4.3	615	<0.005
8	08:21	10:58	3.5	549	<0.005
11	08:27	11:00	4.3	658	<0.005
14	08:34	11:05	4.1	619	<0.005
17	08:40	11:09	4.4	656	<0.005
Gate	08:52	11:16	3.9	562	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	15:22	16:34	1.6	115	<0.005
6					VOID*
9	15:10	16:23	1.6	117	<0.005
12	15:41	16:47	1.6	106	<0.005
15	15:32	16:43	1.6	114	<0.005
18					VOID*
Gate			3.0	699	0.009

* Sample pump stolen from station

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 12, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	08:54	10:56	1.6	195	<0.005
4	09:01	11:02	3.5	423	<0.005
7	09:05	11:05	4.2	504	<0.005
10			3.0	382	<0.005
13	08:40	10:45	4.0	500	<0.005
16	08:45	10:50	3.9	487	<0.005
Gate			3.0	759	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	14:07	16:05	3.0	354	<0.005
5	14:14	16:10	1.6	186	<0.005
8			3.0	342	<0.005
11					VOID*
14	13:56	15:11	3.0	225	<0.005
17	13:59	15:59	3.0	360	<0.005
Gate			3.0	787	<0.005

* Sample pump malfunction

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 13, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	09:27	11:53	1.6	234	<0.005
6	09:33	11:59	1.6	234	<0.005
9			3.0	451	<0.005
12	09:05	11:35	4.0	600	<0.005
15	09:11	11:39	1.6	237	<0.005
18	09:20	11:47	1.6	235	<0.005
Gate			3.0	1002	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	14:05	16:15	1.6	208	<0.005
4	14:12	16:19	1.6	203	<0.005
7	14:17	16:24	3.4	432	<0.005
10	13:48	16:02	1.6	214	<0.005
13	13:53	16:06	4.2	559	<0.005
16	13:57	16:09	4.2	554	<0.005
Gate			3.0	870	0.007

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 14, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	09:27	11:21	3.4	388	<0.005
5	09:34	11:21	1.6	190	<0.005
8			3.0	365	<0.005
11	09:09	11:08	4.3	512	<0.005
14	09:13	11:12	3.9	464	<0.005
17	09:17	11:15	3.4	401	<0.005
Gate					<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	14:10	16:20	1.6	208	<0.005
6			3.0	390	<0.005
9			3.0	401	<0.005
12	13:51	16:04	1.6	213	<0.005
15	13:56	16:08	1.6	211	<0.005
18	14:04	16:15	1.6	210	<0.005
Gate			3.0	990	<0.005

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 17, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	09:03	11:38	4.2	651	<0.005
4	09:09	11:43	3.4	524	0.008
7	09:12	11:45	1.6	245	<0.005
10	08:46	11:26	1.6	256	<0.005
13	08:53	11:29	4.2	655	<0.005
16	08:56	11:32	3.9	608	<0.005
Gate			3.0	822	0.006

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	14:13	16:27	1.6	214	<0.005
5	14:19	16:32	1.6	213	<0.005
8			3.0	656	0.021
11			3.0	655	<0.005
14	14:02	16:18	1.6	218	<0.005
17	14:04	16:20	1.6	218	<0.005
Gate			3.0	656	0.022

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 18, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	09:08	11:18	3.9	507	<0.005
6	09:14	11:27	4.1	545	<0.005
9	08:43	10:58	4.2	567	<0.005
12	08:48	11:01	3.4	452	<0.005
15	08:52	11:09	3.5	479	<0.005
18	09:01	11:12	1.6	210	<0.005
Gate			3.0	858	0.008

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1					VOID*
4	14:22	16:24	1.6	195	<0.005
7			3.0	362	<0.005
10			3.0	376	<0.005
13	14:02	14:07	1.6	200	<0.005
16	14:07	16:11	1.6	198	<0.005
Gate			3.0	376	0.013

* Sample pump stolen from station

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 19, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	09:11	11:34	3.9	558	<0.005
5	09:18	11:39	1.7	240	<0.005
8	08:47	11:18	4.2	634	0.031
11	08:52	11:21	1.6	238	<0.005
14	08:57	11:24	4.2	617	<0.005
17	09:02	11:27	3.4	493	<0.005
Gate			3.0	735	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	14:11	15:58	1.6	171	<0.005
6	14:18	16:04	1.6	170	<0.005
9					VOID*
12	13:48	15:41	1.6	180	<0.005
15	13:58	15:45	1.6	171	<0.005
18	14:05	15:53	1.6	173	<0.005
Gate			3.0	565	0.011
8			3.0	656	0.042

* Sample pump malfunction

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 20, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	09:13	11:44	3.9	589	<0.005
4	09:19	11:49	4.3	645	<0.005
7	09:24	11:52	3.4	503	0.009
10			3.0	490	<0.005
13	09:02	11:13	4.3	654	<0.005
16	09:06	11:37	1.7	257	<0.005
Gate			3.0	796	0.007

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	13:40	15:52	1.6	211	<0.005
5	13:50	15:58	1.6	204	<0.005
8			3.0	488	0.031
11	13:22	15:34	1.6	211	<0.005
14	13:27	15:42	1.6	216	<0.005
17	13:31	15:46	1.6	216	<0.005
Gate			3.0	743	0.013

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 21, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	09:07	11:51	3.9	640	<0.005
6	09:13	11:55	4.2	680	<0.005
8			3.0	701	0.035
9	08:43	11:28	1.7	280	<0.005
12	09:47	11:31	3.5	574	<0.005
15	08:52	11:40	1.6	269	<0.005
18	09:01	11:47	4.1	681	<0.005
Gate			3.0	701	0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	13:18	15:42	1.6	230	<0.005
4	13:24	15:46	1.6	227	<0.005
7	13:28	15:48	1.6	224	<0.005
8			3.0	617	0.012
10	13:00	15:31	1.5	226	<0.005
13	13:08	15:31	1.6	233	<0.005
16	13:12	15:37	1.6	232	<0.005
Gate			3.0	805	0.012

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 22, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	08:59	11:38	4.1	656	<0.005
5	09:04	11:45	3.4	547	<0.005
8			3.0	504	0.043
11	08:38	11:25	3.9	651	<0.005
14	08:43	11:28	4.0	660	<0.005
17	08:48	11:30	1.7	275	<0.005
Gate			3.0	885	0.008

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3					VOID*
6	13:27	15:40	1.6	213	<0.005
9			3.0	543	<0.005
12	13:54	16:01	1.6	184	<0.005
15	13:49	15:56	1.6	203	<0.005
18	13:39	15:50	1.6	210	<0.005
Gate			3.0	655	0.012

* Sample pump malfunction

Table 3.4

PERIMETER AIR MONITORING SUMMARY

September 24, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	08:53	11:41	4.0	672	<0.005
4	08:59	11:45	3.4	564	<0.005
7	09:02	10:18	3.3	251	<0.005
10			3.0	510	<0.005
13	08:41	11:31	1.7	289	<0.005
16	08:45	11:35	4.2	714	<0.005
Gate			3.0	856	0.010

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
2	13:45	16:05	1.6	224	<0.005
5	13:51	15:49	3.0	354	<0.005
8			3.0	450	0.034
11	13:29	15:53	1.6	230	<0.005
14	13:35	15:57	1.6	227	<0.005
17	13:38	15:59	1.6	226	<0.005
Gate			3.0	710	0.010

Table 3.4

PERIMETER AIR MONITORING SUMMARY

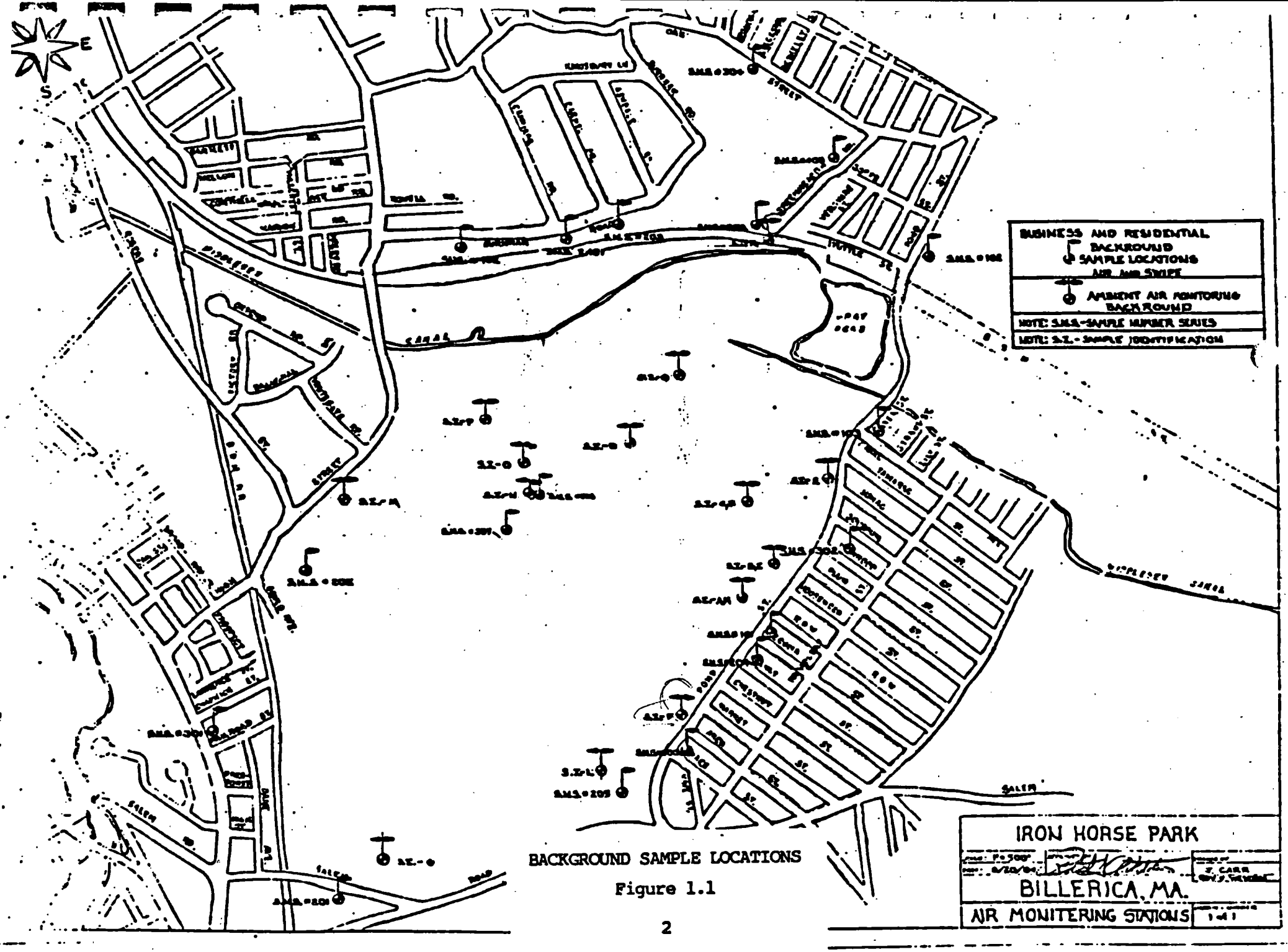
September 25, 1984

Morning Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
3	09:06	11:24	3.5	483	<0.005
6	09:11	11:28	4.4	603	<0.005
9			3.0	430	<0.005
12	08:47	10:10	4.0	332	<0.005
15	08:52	11:11	1.6	222	<0.005
18	09:00	11:19	4.3	598	<0.005
Gate			3.0	794	<0.005

Afternoon Stations	Time On	Time Off	Flow Rate (Lpm)	Sample Volume (L)	Fiber Concentration (fibers/cc)
1	13:19	15:16	1.6	187	<0.005
4	13:23	15:20	1.6	187	0.015
7	13:26	15:23	3.7	433	0.005
10			3.0	363	<0.005
13	13:08	15:09	1.6	194	<0.005
16	13:12	15:11	1.6	190	<0.005
Gate			3.0	666	0.005
8			3.0	327	0.019

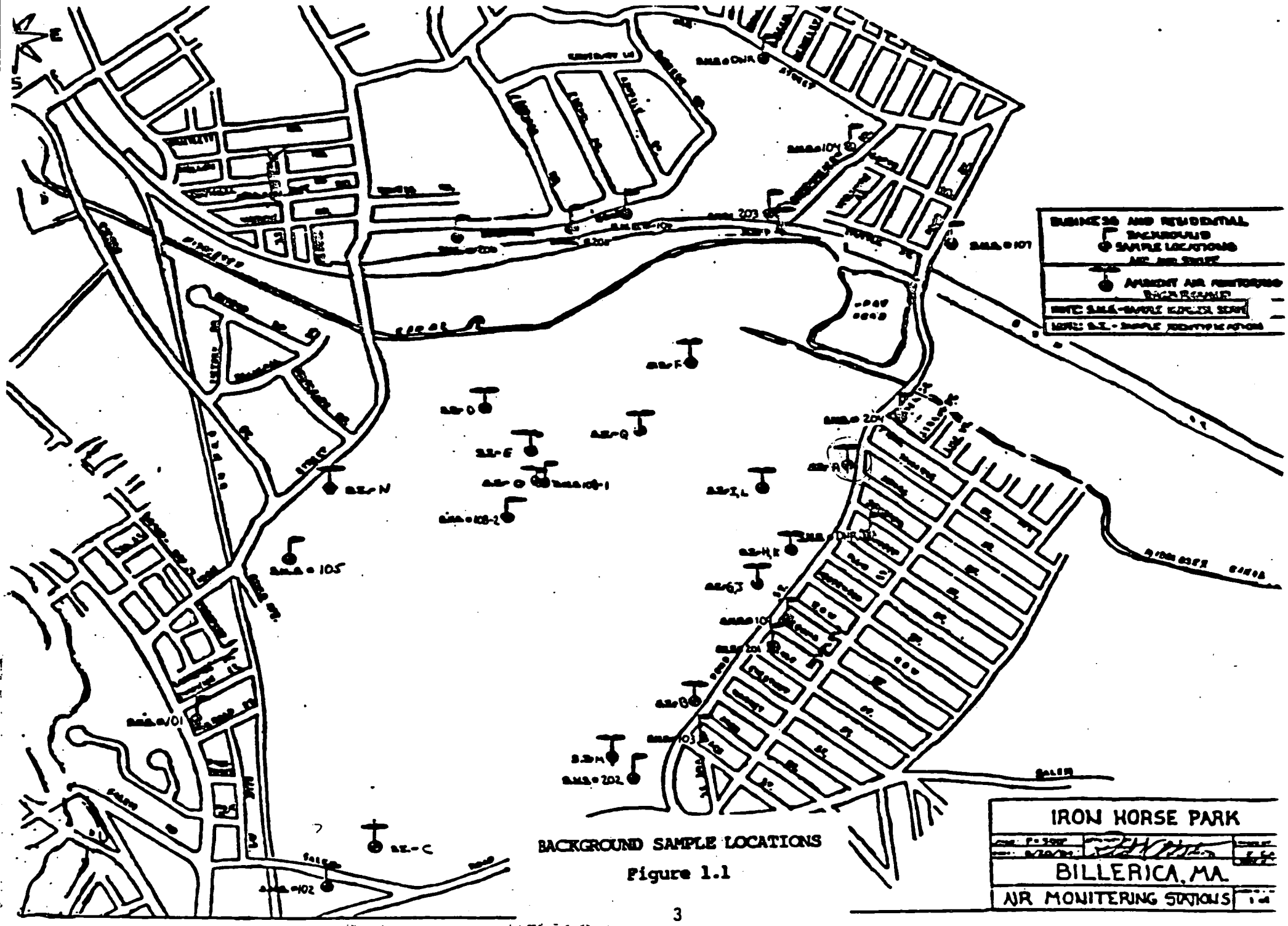
INVESTIGATION TO DETERMINE BACKGROUND ASBESTIFORM FIBER LEVELS IN THE VICINITY OF THE IRON HORSE INDUSTRIAL PARK ASBESTOS LANDFILL BILLERICA, MASSACHUSETTS

Prepared by:	PPC International, Inc. P.O. Box 9 Nahant, MA 01908
Prepared for:	O.H. Materials Co. Box 67 Robbinsville, NJ 08691 (Project No. 2032E29)
P.O. Number:	2032E2916198
Date:	October 4, 1984



BACKGROUND SAMPLE LOCATIONS

Figure 1.1



BACKGROUND SAMPLE LOCATIONS

Figure 1.1

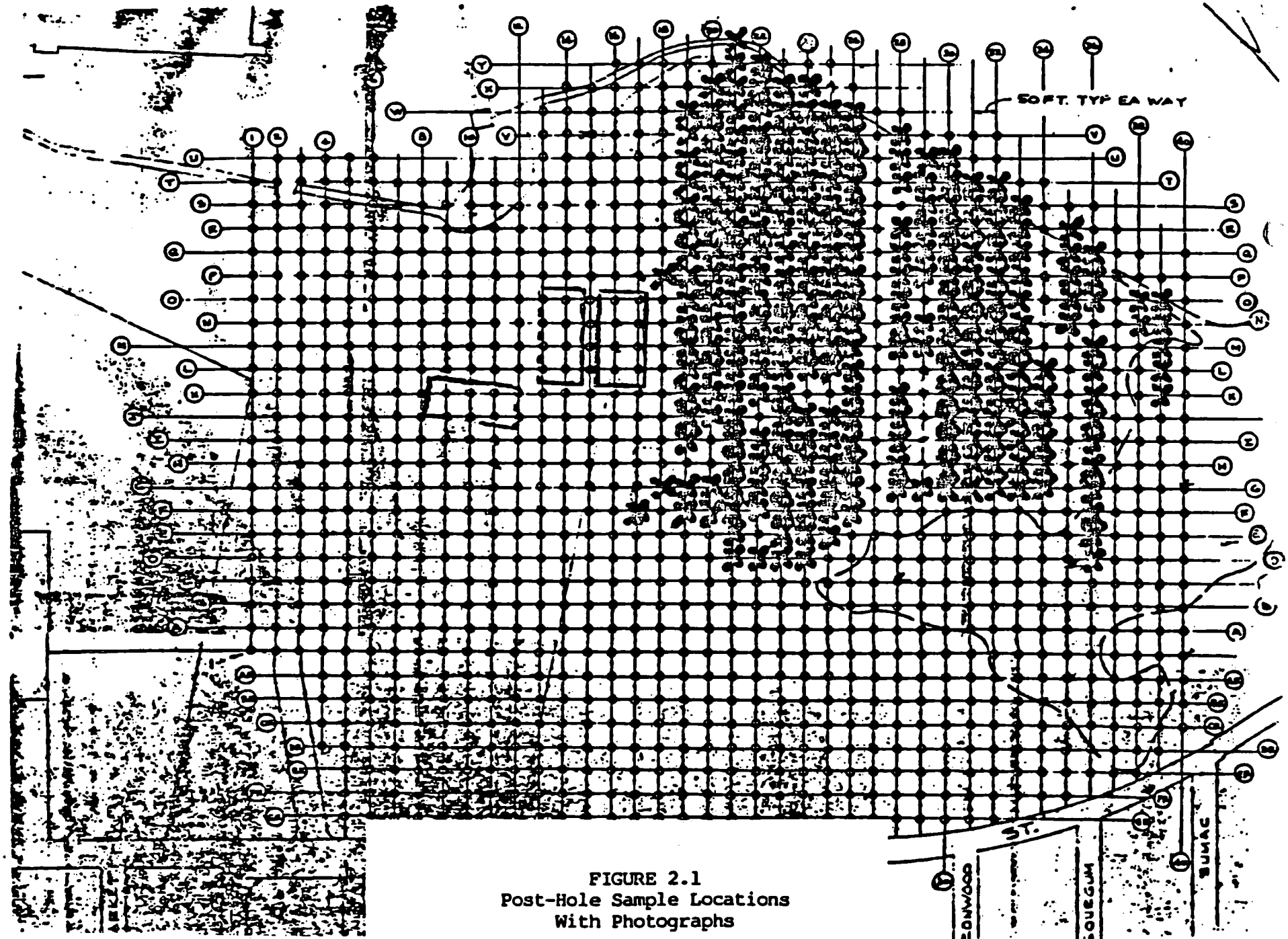


FIGURE 2.1
Post-Hole Sample Locations
With Photographs

Table 3.1

Residential Background Sampling Summary

Address	Owner	Sample Number Series	Contact with Landfill	Asbestos Insulation	Airborne Fiber Level (fibers/cc)	Average Dust Fiber Level (fibers/cm^2)
Redacted		402	No	No	<0.005	337
		401	No	No	<0.005	146
		203	No	No	<0.005	1068
		103	No	No	<0.005	2502
		403	No	No	<0.005	98
		206	Yes	No	0.009	1165
		302	Yes	No	<0.005	274
		304	No	No	<0.005	93
		301	No	No	<0.005	88*
		101	No	No	<0.005	498
		102	Yes	No	<0.005	515
		303	Possibly	No	<0.005	277
		201	No	No	<0.005	18
		204	Nearby	No	<0.005	37

* Represents only one sample

Table 3.2

Business Background Sampling Summary

Location	Sample Number Series	Airborne Fiber Level (fibers/cc)	Average Dust Fiber Level (fibers/cm^2)
B&M Offices	305	<0.005	1065*
B&M Offices	306	0.006	73*
Ronnie's Place 25 High Street	202	<0.005	122
Purity Supreme Warehouse 90 Salem Road	205	<0.005	2371

* Represents only one sample

Table 3.3

Ambient Background Sampling Summary

Location	Sample Identification	Airborne Fiber Level (fibers/cc)
Field	A	<0.005
Field	B	<0.005
Swamp	C	0.006
Swamp	D	<0.005
Sumac Pond	E	<0.005
Arch Pond	F	<0.005
Cemetery	G	<0.005
Field	H	<0.005
Field	I	<0.005
Swamp	J	<0.005
Greenmeadow	K	<0.005
Purity Supreme	L	<0.005
Bob's Garage	M	<0.005
B&M	N	<0.005
JM	O	<0.005
JM	P	<0.005
MBTA	Q	<0.005

nominal magnification. However, the field size used was 0.0031 mm^2. The collection and analytical method used is the only approved standard method available. It was developed for use in manufacturing environments where fiber levels are typically in the range of 1 to 10 fibers/cc. When relatively low fiber levels are being measured (less than 0.1 fibers/cc) such as in these surveys, there can be significant variations in results because of the randomness of the fiber distribution on the filters. The difference of a single fiber can often affect the resulting reported fiber level by as much as fifty percent.

There does seem to be a general increase in the levels observed during the follow-up survey over initial background levels. The largest increase occurred at 4 Canal Avenue where the follow-up survey measured an airborne fiber level of 0.047 fibers/cc. This is well above the background level of <0.005 fibers/cc, and above the accepted average background level of 0.04 fibers/cc for a structure without asbestos material in it. All asbestiform fibers identified were most likely not only asbestos fibers. Rather they are more likely other household fibers which fit the definition of asbestiform fibers and must be counted in accordance with the method. It may be appropriate to take a closer look at area airborne fiber levels to determine if there are indeed asbestos fibers present.

Ambient samples also indicate increased airborne asbestiform fiber levels at several locations. These increases may have resulted in increased emissions from other sources such as the nearby Johns-Mansville manufacturing facility or may be actual

increases as a result of off-site particulate migration during the site work. This is of special concern since the area experienced several days of heavy rain prior to sampling. Moist surface conditions typically reduce the level of airborne particulate. Additionally, testing would be required to identify the true source of airborne asbestiform fibers.

Table 3.1

RESIDENTIAL SAMPLING SUMMARY

Address	Owner	Sample Number Series	Airborne Fiber Level #1 (fibers/cc)	Airborne Fiber Level #2 (fibers/cm^2)	Average Dust Fiber Level #1 (fiber/cm^2)	Average Dust Fiber Level #2 (fiber/cm^2)
Redacted		206	<0.005	0.017	337	740
		205	<0.005	0.035	146	760
		106	<0.005	0.018	1068	149
		204	<0.005	0.047	2502	572
		104	<0.005	0.007	98	167
		203	0.009	0.015	1165	1446
		101	<0.005	0.011	88*	920
		109	<0.005	0.026	498	892
		107	<0.005	0.012	515	3035
		103	<0.005	0.007	277	860
		102	<0.005	0.012	18	264
		201	<0.005	0.007	37	215
		-	<0.005	DNR	93	DNR
		-	<0.005	DNR	274	DNR

* Represents only one sample

Table 3.2

BUSINESS SAMPLING SUMMARY

ocation	Sample Number Series	Airborne Fiber Level #1 (fibers/cc)	Airborne Fiber Level #2 (fibers/cm^2)	Average Dust Fiber Level #1 (fiber/cm^2)	Average Dust Fiber Level #2 (fiber/cm^2)
&M Offices	108-1	<0.005	0.030	1065*	6628
&M Offices	108-2	0.006	0.019	73*	-
onnie's Place 5 High Street	105	<0.005	<0.005	122	1658
urity Supreme Warehouse 0 Salem Road	202	<0.005	0.012	2371	1240

Represents only one sample

Table 3.3

AMBIENT SAMPLING SUMMARY

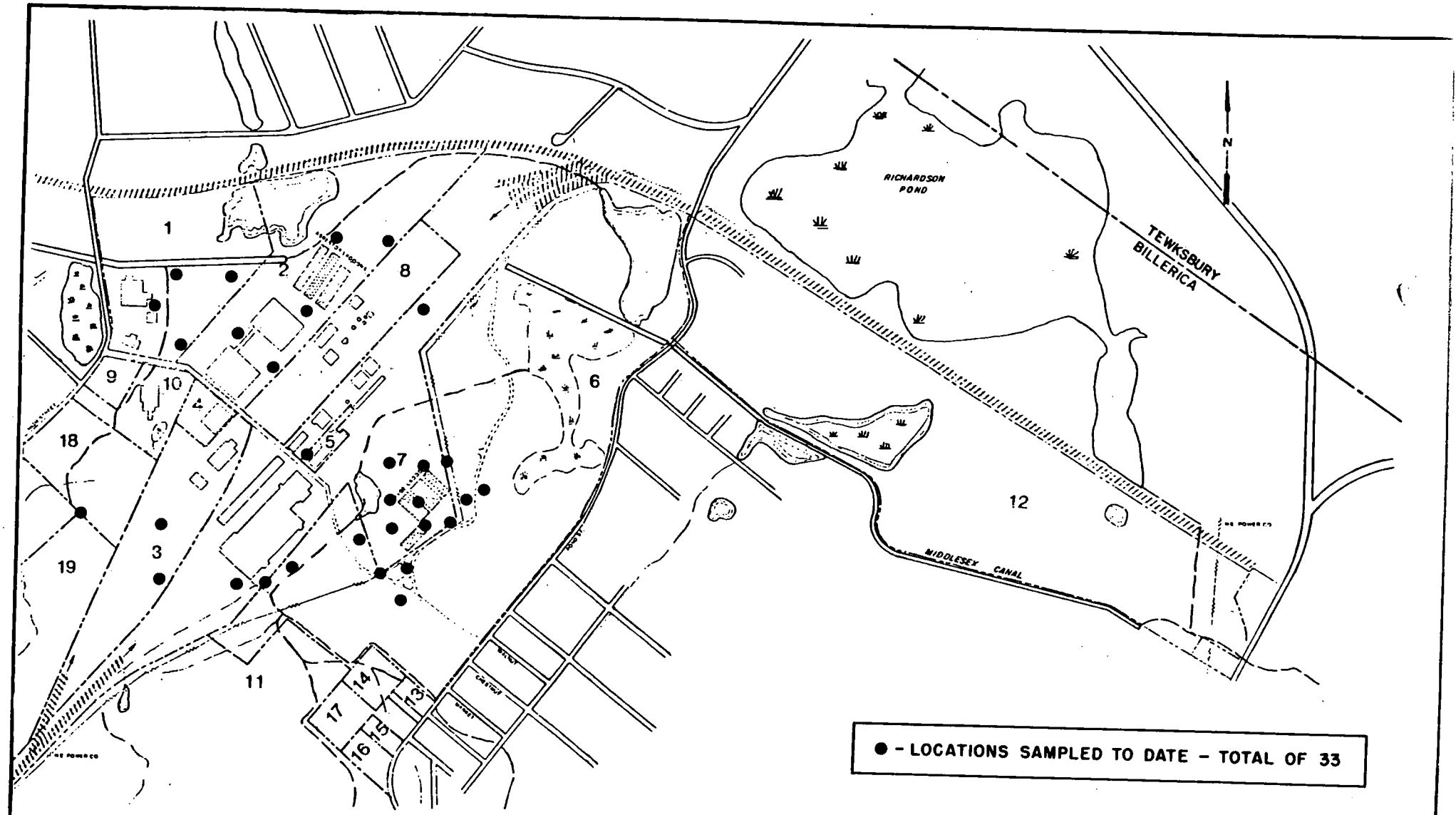
Location	Sample Identification	Airborne Fiber Level #1 (fibers/cc)	Airborne Fiber Level #2 (fibers/cc)
Pond/Sumac St.	A	<0.005	<0.005
Pond/Arch St.	B	<0.005	0.011
Cemetery	C	<0.005	<0.005
JM	D	<0.005	0.006
JM	E	<0.005	0.014
MBTA	F	<0.005	0.005
Field	G	<0.005	<0.005
Field	H	<0.005	<0.005
Swamp	I	0.006	<0.005
Field	J	<0.005	<0.005
Field	K	<0.005	0.005
Swamp	L	<0.005	<0.005
Purity Supreme	M	<0.005	<0.005
Bob's Garage	N	<0.005	<0.005
B & M	O	<0.005	<0.005
Greenmeadow Dr.	P	<0.005	<0.005
Swamp	Q	<0.005	<0.005

IRON HORSE PARK REMEDIAL INVESTIGATION

UPDATE OF ENVIRONMENTAL SAMPLING

SAMPLING DESCRIPTION	STATUS	NUMBER OF SAMPLES TAKEN	NUMBER ORIGINALLY PLANNED
SHALLOW SOILS	100% Complete	66*	66
SURFICIAL SOILS FOR ASBESTOS	50%	20	20
SURFACE WATERS**	90%	25	11
SEDIMENTS**	90%	25	11
SEWER AND DRAIN SYSTEMS (Liquids and Sediments)	?	8*	0

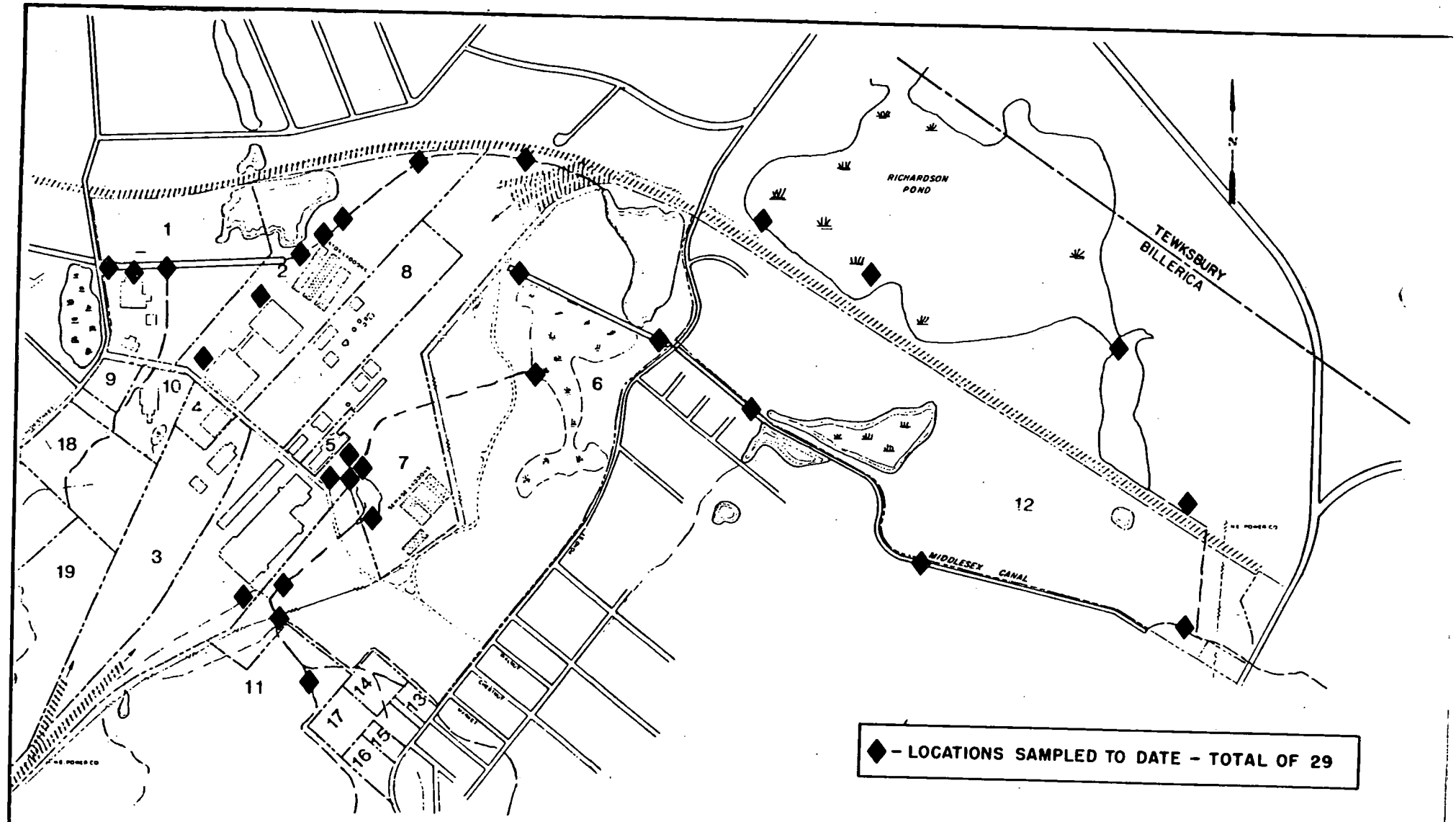
*Two samples were taken at each location.
**One surface water and one sediment sample were taken at each sampling location.



PARCEL OWNERSHIP KEY

LEGEND

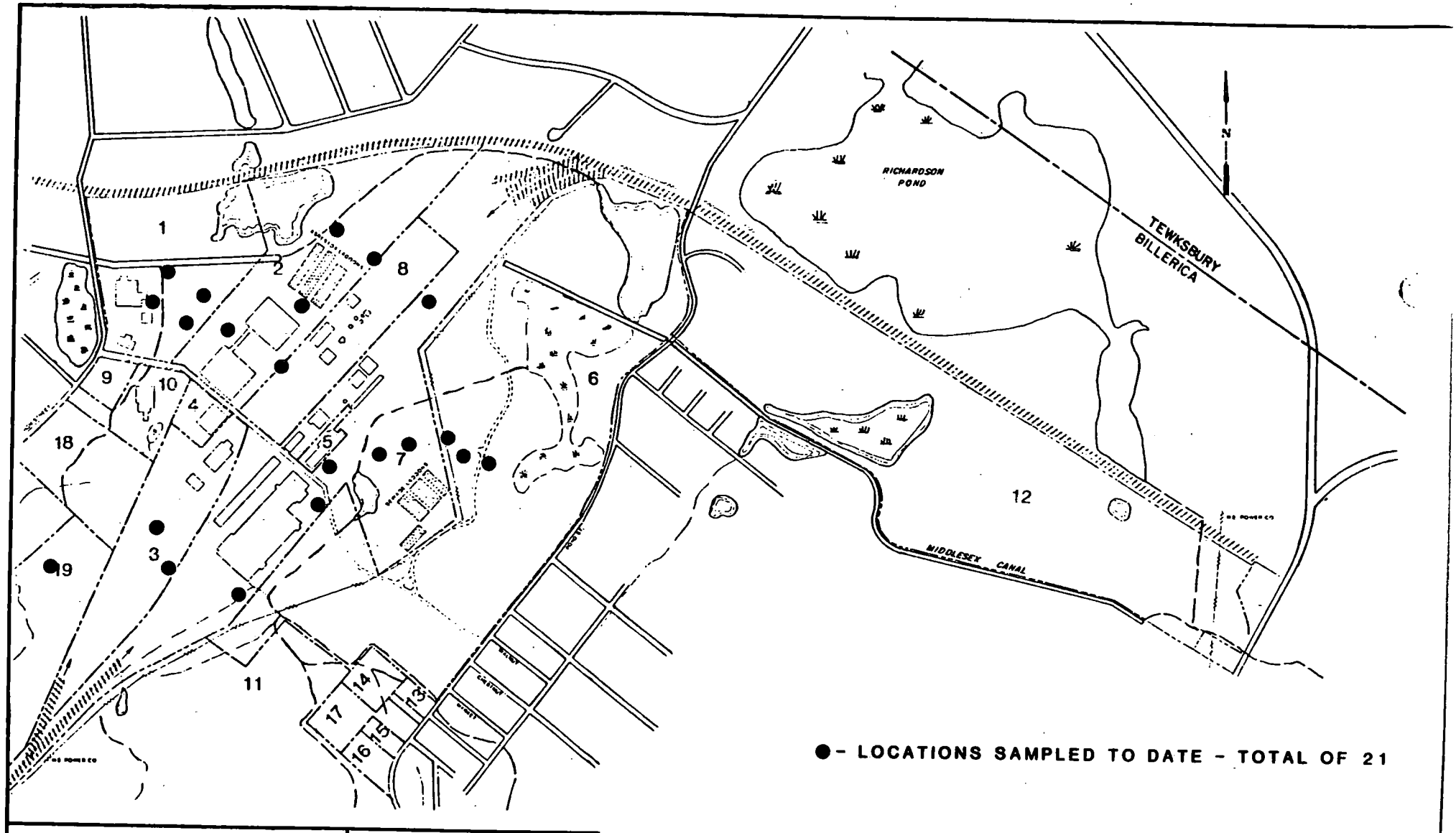
REM II	REMEDIAL INVESTIGATION / FEASIBILITY STUDY IRON HORSE PARK SITE
CAMP DRESSER & McKEE INC. One Center Plaza Boston, Massachusetts 02108 JANUARY, 1986	LOCATIONS OF SHALLOW SOIL BORINGS FOR SOIL SAMPLING



PARCEL OWNERSHIP KEY

LEGEND

REM II	REMEDIAL INVESTIGATION/FEASIBILITY STUDY IRON HORSE PARK SITE
CAMP DRESSER & McKEE INC. One Center Plaza Boston, Massachusetts 02108	LOCATIONS OF SURFACE WATER AND SEDIMENT SAMPLING
JANUARY, 1986	



PARCEL OWNERSHIP KEY

LEGEND

REM II	REMEDIAL INVESTIGATION/FEASIBILITY STUDY IRON HORSE PARK SITE
CAMP DRESSER & McKEE INC. One Center Plaza Boston, Massachusetts 02108	LOCATIONS OF SURFICIAL SOIL SAMPLING
JANUARY 1986	

IRON HORSE PARK REMEDIAL INVESTIGATION

MAJOR FIELD WORK TO BE PERFORMED

TASK	SCHEDULE
GEOPHYSICAL SURVEY	JAN. OR APRIL, 1986 (dependent upon weather)
DRILL AND INSTALL 80 MONITORING WELLS	FEBRUARY THRU MARCH
SAMPLE GROUNDWATER	MARCH & APRIL
SURFICIAL SOIL SAMPLING (Completion)	APRIL

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RESULTS OF ASBESTOS ANALYSIS IN
SURFACE SOIL SAMPLES (0-3" depth) COLLECTED
FROM THE IRON HORSE PARK SITE, BILLERICA, MA

SAS Case Nos.: 2027A[a] and 2166A[b]

Matrix Sampled: Soils

Compoound Analyzed for: Asbestos Minerals

All results reported in Not Detected or Detected

Sample Location	Station Location	SAS Sample Code	Qualitative Results	% Detected
General Latex	SB-18	2027A-11	Not Detected	—
	SB-19	2027A-12	Not Detected	—
	SB-20	2027A-13	Detected	< 1
	SB-21	2027A-14	Not Detected	—
	PZ-01	2166A-1,2	Detected	<< 1
	PZ-16	2166A-20	Detected	< 1
Johns-Manville	SB-22	2027A-15	Detected	< 1
	SB-23	2027A-16	Not Detected	—
	SB-24	2027A-17	Detected	<
	SB-25	2027A-18	Detected	< 1
	SB-26	2027A-19	Detected	1
	PZ-02	2166A-3	Detected	2
	PZ-03	2166A-4	Detected	2
	PZ-04	2166A-5,6	Detected	1
	PZ-05	2166A-7	Not Detected	<< 1
Boston & Maine/ MBTA	SB-03	2027A-1,2	Not Detected	—
	SB-04	2027A-3,4	Detected	< 1
	SB-06	2027A-5,6	Detected	< 1
	SB-07	2027A-7,8	Not Detected	—
	SB-08	2027A-9,10	Not Detected	—
	SB-10	2027A-30	Detected	< 1
	SB-11	2027A-31	Not Detected	—
	SB-12	2027A-32,33	Detected	< 1
	SB-13	2027A-29	Not Detected	—
	SB-14	2027A-25,26	Not Detected	—
	SB-15	2027A-27,28	Detected	< 1
	SB-28	2027A-35	Detected	< 1
	SB-29	2027A-20	Detected	< 1
	SB-30	2027A-21	Not Detected	—
	SB-31	2027A-22	Detected	< 1
	PZ-06	2166A-8	Not Detected	—
	PZ-08	2166A-10,11	Detected	<< 1
	PZ-09	2166A-12	Detected	< 1
	PZ-10	2166A-13	Detected	< 1
	PZ-13	2166A-17	Detected	< 1
	PZ-14	2166A-18	Detected	< 1
	PZ-15	2166A-19	Detected	< 1
	PZ-18	2166A-22	Detected	25

Sample Location	Station Location	SAS Sample Code	Qualitative Results	% Detected
Penn Culvert	SB-27	2027A-34	Not Detected	—
	SB-32	2027A-23	Not Detected	—
	PZ-11	2166A-14	Detected	1
	PZ-12	2166A-15,16	Detected	3
McQuesten	PZ-07	2166A-9	Detected	<< 1
	PZ-17	2166A-21	Detected	< 1
Ronnies	SB-33	2027-24	Detected	< 1

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a - Samples collected for Case 2027A were analyzed optically by Polarized Light Microscopy (PLM) with Dispersion Staining. The results were reported qualitatively as Detected or Not Detected.

b - Samples collected for Case 2166A were analyzed both optically and minerally for asbestos fibers. The optical analysis was done using PLM with the results reported in percent of asbestos fibers detected. The mineral anlaysis was done using a Scanning Electron Microscope with an energy dispersive x-ray microprobe for positive identification of the fibers. The results are presented as fibers program in the attached Summary Table.

SUMMARY TABLE OF QUANTITATIVE ASBESTOS RESULTS FOR SAS CASE NO. 2166A

Sample Location	Station Location	SAS No.	Results (Total Asbestos Fibers/g)
General Latex	PZ-01	1,2	41000
	PZ-16	20	110000
Johns-Manville	PZ-02	3	520000
	PZ-03	4	499200
	PZ-04	5,6	587550
	PZ-05	7	0
Boston and Maine/ MBTA	PZ-06	8	0
	PZ-08	10,11	350000
	PZ-09	12	656000
	PZ-10	13	459000
	PZ-13	17	345000
	PZ-14	18	900000
	PZ-15	19	386000
	PZ-18	22	1.4×10^{10}
Penn Culvert	PZ-11	14	178000
	PZ-12	15,16	447000
McQuesten	PZ-07	9	474600
	PZ-17	21	512000

The Commonwealth of Massachusetts

Department of Environmental Quality Engineering
Division of Air Quality Control
Room C-158, State Hospital
Tewksbury, Massachusetts 01876

Tel: 617-851-4784

May 21, 1986

Middlesex Disposal Inc.
98 Taylor Street
Boston, MA. 02122

RECEIVED
MAY 23 1986
D.E.Q.E.-Northeast Region

ATTN: Burton Shaffer

Gentlemen:

The Department of Environmental Quality Engineering requests permission to enter the Shaffer Land fill located on Pond Street in Billeria for the purpose of taking gas samples from vents and wells for analysis.

The Department has contracted MDS Advanced Analytics Inc. to perform ambient air and source monitoring at different locations throughout the Commonwealth using their TAGA 6000 mobile mass spectrometer.

Several landfills are included on the list of locations to be surveyed. Samples from vents and wells will be analyzed for trace organic compounds. Ambient air monitoring will also be performed around the perimeter of the sites. We require the removal of any locks on the caps of vents that are to be sampled.

Your prompt attention to this request is needed as the sampling is scheduled to commence on the week of May 27.

Your cooperation in this matter will be appreciated and any questions should be directed to Thomas McGrath at the DEQE air monitoring laboratory in Tewksbury (851-4784).

Very Truly Yours,

Donald B. Steele

Donald B. Steele
Chief, Air Quality Surveillance Branch

cc: Anthony Moehike
Sarah Simon, DAQC
Michael Maher, Northeast Region
John Fitzgerald, Northeast Region

TABLE 6-5

QUALITATIVE RESULTS OF ANALYSIS OF VENT SAMPLE FROM SHAFFER LANDFILL

Parent Ion	Det.# Limit (ppb)	Target Compounds	Shaffer Landfill
54	30	Acrylonitrile	-
59	20	Acetone	
62	-	Vinyl Chloride	ND
64	-/20	Vinyl Chloride/Dichloroethane	ND
71	20	C_5 Alkane	✓
73	10	Methyl Ethyl Ketone	✓
75	30	Butanol	ND
	30	Methyl Acetate	ND
78	10	Benzene	ND
83	40	Chloroform/Methylene Chloride	ND
	20	C_6 Alkene	✓
85	40	Chloroform/Methylene Chloride	ND
	20	C_6 Alkane	✓
87	30	Methyl Acrylate	ND
	30	Pentanone	ND
89	30	Ethyl Acetate	ND
92	10	Toluene	✓
94	100	Phenol	-
97	40	$C_2H_2Cl_2$ Isomers*	ND

(continued)

*Represents Dichloroethane, Methyl Chloroform, Vinylidene Chloride and 1,1,2-Trichloroethane.

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JUN 17 1987
D.E.Q.E. Northeast Regi

TABLE 6-5 (continued)

QUALITATIVE RESULTS OF ANALYSIS OF VENT SAMPLE FROM SHAFFER LANDFILL

Parent Ion	Det.# Limit (ppb)	Target Compounds	Shaffer Landfill
119	40	Carbon Tetrachloride	ND
	30	Butyl Cellosolve	ND
120	20	C_3 Benzene	✓
125	20	C_9 Alkene	✓
127	20	C_9 Alkane	✓
131	30	Trichloroethylene	ND
	20	C_5 Acetate	ND
133	30	Trichloroethylene	ND
134	20	C_4 Benzene	✓
137	20	Terpenes	-
139	30	C_{10} Alkene	✓
141	30	C_{10} Alkane	✓
146	25	Dichlorobenzene	ND
148	25	Dichlorobenzene	ND
153	30	C_{11} Alkene	✓
155	30	C_{11} Alkane	✓
164	50	Perchloroethylene	ND
166	50	Perchloroethylene	ND
169	30	C_{12} Alkane	✓

✓ = Qualitatively Identified
ND = Not Detected
- = Not Analyzed
= Estimated from historical data

TABLE 6-5 (continued)

QUALITATIVE RESULTS OF ANALYSIS OF VENT SAMPLE FROM SHAFFER LANDFILL

Parent Ion	Det.# Limit (ppb)	Target Compounds	Shaffer Landfill
	20	C_7 Alkene	✓
99	40	$C_2H_2Cl_2$ Isomers*	ND
	20	C_7 Alkane	✓
101	20	Methyl Isobutyl Ketone	✓
	30	Ethyl Acrylate	ND
	30	Methyl Methacrylate	ND
103	30	C_3 Acetate	ND
105	10	Styrene	ND
106	10	Xylene/Ethyl Benzene	✓
107	10	Benzaldehyde	ND
108	50	Cresol	-
111	20	C_8 Alkene	✓
112	10	Chlorobenzene	✓
113	20	C_8 Alkane	✓
114	10	Chlorobenzene	✓
115	30	C_3 Acrylate	ND
	30	C_7 Ketone	ND
117	40	Carbon Tetrachloride	ND
	30	Butyl Acetate	ND

(continued)

*Represents Dichloroethane, Methyl Chloroform, Vinylidene Chloride and 1,1,2-Trichloroethane.