HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-166	08/1 and 08/03/95	120	Pass	145	
DS-167	08/1 and 08/03/95	123	Pass	147	
DS-168	08/1 and 08/03/95	109	Pass	151	
DS-169	08/1 and 08/03/95	113	Pass	151	
DS-170	08/01/1995	112	Pass	156	
DS-171	08/01/1995	117	Pass	149	
DS-172	08/01/1995	129	Pass	153	
DS-173	08/01/1995	108	Pass	151	
DS-174	08/8 and 08/09/95	124	Pass	170	
DS-175	08/8 and 08/09/95	120	Pass	170	
DS-176	08/8 and 08/09/95	128	Pass	162	
DS-177	08/09/1995	117	Pass	159	
DS-178	08/09/1995	119	Pass	158	
DS-179	08/09/1995	119	Pass	152	
DS-180	08/09/1995	124	Pass	151	
DS-181	08/09/1995	114	Pass	149	
DS-182	08/09/1995	128	Pass	158	
DS-183	08/10/1995	107	Pass	152	1 of 5 peel tests below spec (88)
DS-184	08/10/1995	127	Pass	151	
DS-185	08/10/1995	123	Pass	160	
DS-186	08/10/1995	121	Pass	154	
DS-187	08/10/1995	116	Pass	154	
DS-188	08/10/1995	118	Pass	148	
DS-189	08/15/1995	116	Pass	164	
DS-190	08/15/1995	126	Pass	153	
DS-191	08/15/1995	121	Pass	159	
DS-192	08/15/1995	128	Pass	168	
DS-193	08/15/1995	129	Pass	156	
DS-194	08/15/1995	129	Pass	158	

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-195	08/16/1995	128	Pass	156	
DS-196	08/16/1995	127	Pass	163	
DS-197	08/16/1995	118	Pass	155	
DS-198	08/16/1995	123	Pass	167	
DS-199	08/16/1995	114	Pass	154	
DS-200	08/16/1995	118	Pass	151	
DS-201	08/16/1995	116	Pass	160	
DS-202	08/16/1995	113	Pass	148	
DS-203	08/16/1995	120	Pass	150	
DS-204	08/16/1995	127	Pass	152	
DS-205	08/16/1995	128	Pass	153	
DS-206	08/16/1995	120	Pass	150	
DS-207	08/18/1995	123	Pass	153	
DS-208	08/22/1995	135	Pass	177	
DS-209	08/22/1995	127	Pass	169	
DS-210	08/22/1995	133	Pass	174	
DS-211	08/23/1995	76	Fail	176	2 of 5 peel tests below spec (88)
DS-211A	08/25/1995	128	Pass	159	
DS-211B	08/25/1995	102	Pass	163	
DS-212	08/23/1995	117	Pass	172	
DS-213	08/23/1995	108	Pass	158	1 of 5 shear tests below spec (113)
DS-214	8/24 and 08/25/1995	--	Fail	--	No Overlap
DS-214A	08/25/1995	123	Pass	166	
DS-214B	08/25/1995	115	Pass	165	
DS-215	8/24 and 08/25/1995	114	Pass	184	
DS-216	8/24 and 08/25/1995	101	Pass	181	1 of 5 peel tests below spec (88)
DS-217	08/25/1995	104	Fail	--	no shear test conducted
DS-217A	08/25/1995	122	Pass	168	
DS-217B	08/25/1995	141	Pass	177	

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-218	08/25/1995	118	Pass	173	
DS-219	08/25/1995	114	Pass	167	
DS-220	08/30/1995	130	Pass	186	
DS-221	08/30/1995	135	Pass	167	
DS-222	08/30/1995	126	Pass	174	
DS-223	08/30/1995	133	Pass	179	
DS-224	08/30/1995	134	Pass	183	
DS-225	08/30/1995	121	Pass	190	
DS-226	08/30 and 09/01/1995	123	Pass	173	
DS-227	08/30 and 09/01/1995	134	Pass	169	
DS-228	08/30 and 09/01/1995	125	Pass	170	
DS-229	08/31/1995	137	Pass	182	
DS-230	08/31/1995	133	Pass	166	
DS-231	08/31/1995	125	Pass	155	
DS-232	08/31/1995	125	Pass	167	
DS-233	08/31/1995	130	Pass	159	
DS-234	08/31/1995	127	Pass	162	
DS-235	09/07/1995	151	Pass	196	
DS-236	09/07/1995	137	Pass	201	
DS-237	09/07/1995	133	Pass	202	
DS-238	09/07 and 09/08/1995	137	Pass	189	
DS-239	09/07 and 09/08/1995	153	Pass	191	
DS-240	09/07 and 09/08/1995	150	Pass	187	
DS-241	09/08/1995	116	Pass	187	
DS-242	09/11/1995	130	Pass	189	
DS-243	09/11/1995	116	Pass	190	1 of 5 peel tests below spec (88)
DS-244	09/11/1995	133	Pass	180	
DS-245	09/11/1995	127	Pass	179	
DS-246	09/11/1995	133	Pass	181	

Prepared by: E. Nathanson
Checked by: S. Albrecht 6/23/99

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-247	09/11/1995	135	Pass	181	
DS-248	09/12/1995	137	Pass	178	
DS-249	09/12/1995	122	Pass	164	
DS-250	09/12/1995	126	Pass	157	
DS-251	09/12 and 09/13/1995	129	Pass	183	
DS-252	09/12 and 09/13/1995	126	Pass	156	
DS-253	09/12 and 09/13/1995	137	Pass	189	
DS-254	09/13/1995	127	Pass	193	
DS-255	09/13/1995	124	Pass	158	
DS-256	09/14 and 09/15/1995	156	Pass	186	
DS-257	09/14 and 09/15/1995	141	Pass	184	
DS-258	09/14 and 09/15/1995	140	Pass	184	
DS-259	09/15/1995	136	Pass	178	
DS-260	09/19/1995	144	Pass	197	
DS-261	09/19/1995	142	Pass	196	
DS-262	09/19/1995	114	Fail	--	1of 4 peel tests failed, no shear test conducted
DS-262A	09/19/1995	102	Fail	--	2 peel tests failed, no shear test conducted
DS-262B	09/19/1995	137	Pass	187	
DS-262C	09/19/1995	111	Fail	--	2 peel tests failed, no shear test conducted
DS-262D	09/19/1995	142	Pass	179	
DS-262E	09/15 and 09/21/1995	122	Pass	175	
DS-263	09/19/1995	138	Pass	186	
DS-264	09/19/1995	141	Pass	190	
DS-265	09/20/1995	118	Pass	182	
DS-266	09/20/1995	120	Pass	180	
DS-267	09/20/1995	104	Pass	177	
DS-268	09/20 and 09/21/1995	115	Pass	177	
DS-269	09/20 and 09/21/1995	115	Pass	181	
DS-270	09/20 and 09/21/1995	148	Pass	166	

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-271	09/21/1995	97	Pass	196	
DS-272	09/21/1995	113	Pass	167	
DS-273	09/21/1995	123	Pass	176	
DS-274	09/15 and 09/21/1995	125	Pass	192	
DS-275	09/15 and 09/21/1995	118	Pass	162	
DS-276	09/28/1995	106	Pass	174	
DS-277	09/28/1995	112	Pass	185	
DS-278	09/28/1995	137	Pass	172	
DS-279	09/29/1995	111	Pass	172	
DS-280	09/29/1995	127	Pass	172	
DS-281	09/29/1995	134	Pass	173	
DS-282	10/02/1995	128	Pass	177	
DS-283	10/02/1995	134	Pass	183	
DS-284	10/02/1995	121	Pass	181	
DS-285	10/03/1995	119	Pass	178	
DS-286	10/03/1995	117	Pass	172	
DS-287	10/10/1995	147	Pass	167	
DS-288	10/10/1995	135	Pass	170	
DS-289	10/10/1995	113	Pass	152	
DS-290	10/10/1995	118	Pass	166	
DS-291	10/10/1995	120	Pass	171	
DS-292	10/10/1995	120	Pass	168	
DS-293	10/10 and 10/11/1995	128	Pass	175	
DS-294	10/10 and 10/11/1995	120	Pass	156	
DS-295	10/10 and 10/11/1995	116	Pass	168	
DS-296	10/11/1995	107	Pass	160	
DS-297	10/11/1995	105	Pass	171	1 of 5 peel tests failed, below spec (88)
DS-298	10/18/1995	118	Pass	184	
DS-299	10/18/1995	116	Pass	191	1 of 5 peel tests below spec (88)

Prepared by: E. Nathanson
Checked by: S. Albrecht 6/23/99

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-300	10/18/1995	113	Pass	183	
DS-301	10/19/1995	123	Pass	184	
DS-302	10/19/1995	125	Pass	169	
DS-303	10/19/1995	123	Pass	176	
DS-304	10/19/1995	123	Pass	174	
DS-305	10/23/1995	124	Pass	182	
DS-306	10/23/1995	108	Pass	176	
DS-307	10/23/1995	114	Pass	178	
DS-308	10/23 and 10/24/1995	125	Pass	174	
DS-309	10/23 and 10/24/1995	130	Pass	176	
DS-310	10/23 and 10/24/1995	104	Pass	162	1 of 5 peel tests failed, below spec (88)
DS-311	10/24 and 10/26/1995	121	Pass	193	
DS-312	10/24 and 10/26/1995	126	Pass	169	
DS-313	10/24 and 10/26/1995	108	Pass	196	
DS-314	10/26/1995	107	Pass	175	
DS-315	10/26/1995	127	Pass	171	
DS-316	10/26/1995	121	Pass	181	
DS-317	10/25 and 10/26/1995	115	Pass	176	
DS-318	10/25 and 10/26/1995	115	Pass	166	
DS-319	10/25 and 10/26/1995	121	Pass	183	
DS-320	10/26/1995	121	Pass	176	
DS-321	10/26/1995	116	Pass	178	
DS-322	10/26/1995	126	Fail	--	2 of 3 peel tests failed, no shear test conducted
DS-322A	10/26 and 10/30/1995	99	Fail	155	1 of 5 tests in each test type failed
DS-322B	10/26 and 10/30/1995	143	Pass	176	
DS-323	10/26 and 10/30/1995	149	Pass	225	
DS-324	10/30/1995	54	Fail	--	2 peel tests failed, no shear test conducted
DS-324A	10/30/1995	80	Fail	--	2 peel tests failed, no shear test conducted
DS-324B	10/30/1995	117	Pass	200	

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-325	11/03 and 11/06/1995	125	Pass	188	
DS-326	11/03 and 11/06/1995	107	Pass	219	Only four shear tests conducted
DS-327	11/03 and 11/06/1995	116	Pass	200	
DS-328	11/01 and 11/03/1995	126	Pass	189	
DS-329	11/01 and 11/03/1995	89	Fail	--	2 of 5 peel tests failed, no shear test conducted
DS-329A	11/01/1995	85	Fail	--	2 of 3 peel tests failed, no shear test conducted
DS-329B	11/01/1995	111	Pass	180	
DS-329C	11/01/1995	136	Pass	185	
DS-330	11/01 and 11/03/1995	123	Pass	182	
DS-331	11/01/1995	123	Pass	176	
DS-332	11/01/1995	130	Pass	178	
DS-333	11/01/1995	110	Pass	194	
DS-334	11/01 and 11/06/1995	119	Pass	194	
DS-335	11/01 and 11/06/1995	128	Pass	197	
DS-336	11/13/1995	93	Fail	--	2 of 3 peel tests failed, no shear test conducted
DS-336A	not provided	52	Fail	--	2 peel tests failed, no shear test conducted
DS-336B	not provided	48	Fail	--	2 peel tests failed, no shear test conducted
DS-336C	not provided	132	Fail	221	
DS-337	11/13/1995	149	Pass	211	
DS-338	11/13/1995	113	Pass	208	
DS-339	11/06/1995	139	Pass	203	
DS-340	11/06/1995	118	Pass	199	
DS-341	11/06/1995	142	Pass	194	
DS-342	11/06/1995	135	Pass	196	
DS-343	11/06/1995	123	Pass	188	
DS-344	11/06/1995	117	Pass	182	
DS-345	11/06/1995	139	Pass	177	
DS-346	11/06/1995	117	Pass	167	
DS-347	11/06/1995	81	Fail	--	2 of 3 peel tests failed, no shear test conducted

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-347A	11/10/1995	108		174	
DS-347B	11/10/1995	110		190	1 of 5 peel tests below spec (88)
DS-348	11/06/1995	--	Fail	--	peeled by hand
DS-349	11/06/1995	123	Pass	186	
DS-350	11/06/1995	122	Pass	165	
DS-351	11/06/1995	125	Pass	192	
DS-352	11/06/1995	110	Pass	180	1 of 5 peel tests failed
DS-353	11/06/1995	26	Fail	--	2 of 2 peel tests failed, no shear test conducted
DS-354	11/17/1995	151	Pass	226	
DS-355	11/17/1995	143	Pass	226	
DS-356	11/17/1995	127	Pass	209	
DS-357	11/17 and 11/18/1995	139	Pass	176	
DS-358	11/17 and 11/18/1995	129	Pass	221	
DS-359	11/17 and 11/18/1995	122	Pass	212	
DS-360	11/18/1995	130	Pass	174	
DS-361	11/18/1995	139	Pass	194	
DS-362	11/18/1995	128	Pass	197	
DS-363	?11/19/1995	122	Pass	182	
DS-364	?11/19/1995	128	Pass	170	
DS-365	?11/19/1995	103	Pass	183	
DS-366	11/20 and 11/22/1995	136	Pass	183	
DS-367	11/20 and 11/22/1995	149	Pass	197	
DS-368	11/20 and 11/22/1995	134	Pass	181	
DS-369	11/22/1995	136	Pass	191	
DS-370	11/22/1995	124	Pass	147	
DS-371	11/22/1995	120	Pass	152	
DS-372	11/22/1995	132	Pass	187	
DS-373	11/22/1995	104	Pass	157	
DS-374	11/22/1995	121	Pass	150	1 of 5 peel tests below spec (88)

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
DS-375	11/25/1995	133	Pass	190	
DS-376	11/25/1995	116	Pass	178	
DS-377	11/25/1995	128	Pass	164	
DS-378	11/25/1995	134	Pass	184	
DS-379	11/25/1995	134	Pass	180	
DS-380	11/25/1995	130	Pass	185	
		Replacement Panel Weld Test Results			
DS-R1	05/20/1996	104	Pass	149	
DS-R2	05/20/1996	119	Pass	153	
DS-R3	05/20/1996	107	Pass	149	
DS-R4	05/22/1996	111	Pass	147	
DS-R5	05/22/1996	134	Pass	143	
DS-R6	05/22/1996	116	Pass	146	
DS-R7	05/23/1996	122	Pass	156	
DS-R8	05/23/1996	118	Pass	146	
DS-R9	05/23/1996	119	Pass	152	
DS-R10	05/23/1996	114	Pass	160	
DS-R11	05/23/1996	125	Pass	162	
DS-R12	05/23/1996	126	Pass	155	
DS-R13	05/24/1996	119	Pass	189	
DS-R14	05/24/1996	123	Pass	189	
DS-R15	05/24/1996	111	Pass	190	
DS-R16	05/24/1996	131	Pass	197	
DS-R17	not provided	111	Pass	179	
DS-R18	not provided	115	Pass	169	
DS-R19	not provided	119	Pass	167	
DS-R20	not provided	132	Pass	169	
DS-R21	not provided	99	Pass	141	1 of 5 peel tests below spec (88)
DS-R22	06/03/1996	145	Pass	211	

HDPE GEOMEMBRANE CONTRACTOR DESTRUCTIVE SEAM STRENGTH TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Sample Number	Sample Date	PEEL EVALUATION Mean Maximum Tension (PPI)	Pass / Fail	SHEAR EVALUATION Mean Maximum Tension (PPI)	Remarks
		Replacement Panel Weld Test Results (continued)			
DS-R23	06/03/1996	146	Pass	217	
DS-R24	05/31/1996	150	Pass	190	
DS-R25	06/04/1996	123	Pass	169	
DS-R26	06/04/1996	125	Pass	166	
DS-R27	06/04/1996	115	Pass	151	1 of 5 peel tests below spec (88)
DS-R28	06/05/1996	116	Pass	175	
DS-R29	06/05/1996	131	Pass	164	
DS-R30	06/05/1996	119	Pass	169	
DS-R31	06/05/1996	132	Pass	158	1 of 5 peel tests below spec (88)
DS-R32	06/05/1996	114	Pass	161	
DS-R33	06/06/1996	133	Pass	157	
DS-R34	06/06/1996	120	Pass	159	
DS-R35	06/06/1996	134	Pass	167	
DS-R36	06/07/1996	121	Pass	162	
DS-R37	06/07/1996	123	Pass	162	
DS-R38	06/07/1996	132	Pass	152	
DS-R39	06/07/1996	135	Pass	157	
DS-R40	06/07/1996	142	Pass	148	

B-7 HDPE Geomembrane QA Destructive Seam Field Test Log

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
05/04/1995	DS-1	2/3	P	P	P	Y	V
05/04/1995	DS-2	6/7	P	P	P	Y	V
05/04/1995	DS-3	16/17	P	P	P	Y	V
05/04/1995	DS-4	19/20	P	P	P	Y	V
05/04/1995	DS-5	21/22	P	P	P	Y	V
05/04/1995	DS-6	23/24	P	P	P	Y	V
05/04/1995	DS-7	25/26	P	P	P	Y	V
05/08/1995	DS-8	30/31	P	P	P	Y	V
05/08/1995	DS-9	27/43	P	P	P	Y	V
05/09/1995	DS-10	29/30	P	P	P	Y	V
05/09/1995	DS-11	43/44	P	P	P	Y	V
05/09/1995	DS-12	44/45	P	P	P	Y	V
05/09/1995	DS-13	46/47	P	P	P	Y	V
05/09/1995	DS-14	18/49	P	P	P	Y	V
05/09/1995	DS-15	50/51	P	P	P	Y	V
05/09/1995	DS-16	51/52	P	P	P	Y	V
05/09/1995	DS-17	53/54	P	P	P	Y	V
05/15/1995	DS-18	55/56	P	P	P	Y	V
05/15/1995	DS-19	56/57	P	P	P	Y	V
05/18/1995	DS-20	57/58	P	P	P	Y	V
05/18/1995	DS-21	63/64	P	P	P	Y	V
05/18/1995	DS-22	62/63	P	P	P	Y	V
05/18/1995	DS-23	60/61	P	P	P	Y	V
05/18/1995	DS-24	55/56	P	P	P	Y	V
05/18/1995	DS-25	66/19	P	P	P	Y	V
05/18/1995	DS-26	69/70	P	P	P	Y	V
05/22/1995	DS-27	71/72	P	P	P	Y	V
05/22/1995	DS-28	74/75	P	P	P	Y	V
05/22/1995	DS-29	76/77	P	P	P	Y	V
05/22/1995	DS-30	84/85	P	P	P	Y	V
05/22/1995	DS-31	87/88	P	P	P	Y	V
05/22/1995	DS-32	90/91	P	P	P	Y	V
05/22/1995	DS-33	93/94	P	P	P	Y	V
05/22/1995	DS-34	96/97	P	P	P	Y	V
05/22/1995	DS-35	107/108	P	P	P	Y	V
05/22/1995	DS-36	100/101	P	P	P	Y	V
05/22/1995	DS-37	105/106	P	P	P	Y	V
05/24/1995	DS-38	117/124	P	P	P	Y	V
05/24/1995	DS-39	118/119	P	P	P	Y	V
05/24/1995	DS-40	88/120	P	P	P	Y	V
05/24/1995	DS-41	125/126	P	P	P	Y	V
05/24/1995	DS-42	127/128	P	P	P	Y	V
05/24/1995	DS-43	129/130	P	P	P	Y	V
05/24/1995	DS-44	131/132	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
05/24/1995	DS-45	133/134	P	P	P	Y	V
05/24/1995	DS-46	135/136	P	P	P	Y	V
05/24/1995	DS-47	137/138	P	P	P	Y	V
05/31/1995	DS-48	90/95	P	P	P	Y	V
05/31/1995	DS-49	139/140	P	P	P	Y	V
05/31/1995	DS-50	141/142	F	F	P	Y	V
05/31/1995	DS-51	143/157	P	P	P	Y	V
05/31/1995	DS-52	158/159	P	P	P	Y	V
05/31/1995	DS-53	116/151	P	P	P	Y	V
05/31/1995	DS-54	155/156	P	P	P	Y	V
06/01/1995	DS-55	74/144	P	P	P	Y	V
06/01/1995	DS-50A	141/142	F	F	P	Y	V
06/01/1995	DS-50B	141/142	F	F	P	Y	V
06/02/1995	DS-56	156/161	P	P	P	Y	V
06/02/1995	DS-57	160/163???	P	P	P	Y	V
06/02/1995	DS-58	164/165	P	P	P	Y	V
06/02/1995	DS-51	166/167	P	P	P	Y	V
06/02/1995	DS-50C	141/140	P	P	P	Y	V
06/02/1995	DS-50D	116/151	P	P	P	Y	V
06/02/1995	DS-60	168/169	P	P	P	Y	V
06/02/1995	DS-61	170/171	P	P	P	Y	V
06/02/1995	DS-62	172/173	P	P	P	Y	V
06/02/1995	DS-63	174/175	P	P	P	Y	V
06/02/1995	DS-64	181/180	P	P	P	Y	V
06/02/1995	DS-65	184/185	P	P	P	Y	V
06/06/1995	DS-44A	131/132	P	P	P	Y	V
06/06/1995	DS-44B	131/132	?	?	P	Y	V
06/06/1995	DS-44C	131/132	P	P	P	Y	V
06/07/1995	DS-66	183/184	P	P	P	Y	V
06/07/1995	DS-67	178/179	P	P	P	Y	V
06/07/1995	DS-68	186/193	P	P	P	Y	V
06/07/1995	DS-69	175/187	P	P	P	Y	V
06/07/1995	DS-70	188/189	P	P	P	Y	V
06/07/1995	DS-71	190/191	P	P	P	Y	V
06/12/1995	44D	131/132	F?	F?	P	Y	V
06/12/1995	44E	134/135	P	P	P	Y	V
06/13/1995	DS-72	206/207	P	P	P	Y	V
06/13/1995	DS-73	208/209	P	P	P	Y	V
06/13/1995	DS-74	213/214	P	P	P	Y	V
06/13/1995	DS-75	217/218	P	P	P	Y	V
06/13/1995	DS-76	219/220	P	P	P	Y	V
06/13/1995	DS-77	221/222	P	P	P	Y	V
06/13/1995	DS-78	157/223	P	P	P	Y	V
06/19/1995	DS-79	225/226	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
06/19/1995	DS-80	227/228	P	P	P	Y	V
06/19/1995	DS-81	229/230	P	P	P	Y	V
06/19/1995	DS-82	230/231	P	P	P	Y	V
06/20/1995	DS-83	233/234	P	P	P	Y	V
06/20/1995	DS-84	236/238	P	P	P	Y	V
06/20/1995	DS-85	240/237	P	P	P	Y	V
06/22/1995	DS-86	242/243	P	P	P	Y	V
06/22/1995	DS-87	244/245	P	P	P	Y	V
06/22/1995	DS-88	246/247	P	P	P	Y	V
06/22/1995	DS-89	250/251	P	P	P	Y	V
06/22/1995	DS-90	255/256	P	P	P	Y	V
06/28/1995	DS-91	257/258	P	P	P	Y	V
06/28/1995	DS-92	259/260	P	P	P	Y	V
06/28/1995	DS-93	262/265	P	P	P	Y	V
06/28/1995	DS-94	263/264	P	P	P	Y	V
06/28/1995	DS-95	265/271	P	P	P	Y	V
06/28/1995	DS-96	273/275	P	P	P	Y	V
07/03/1995	DS-97	257/287	P	P	P	Y	V
07/03/1995	DS-98	288/289	P	P	P	Y	V
07/03/1995	DS-99	290/291	P	P	P	Y	V
07/03/1995	DS-100	292/293	P	P	P	Y	V
07/03/1995	DS-101	294/295	P	P	P	Y	V
07/03/1995	DS-102	298/297	P	P	P	Y	V
07/03/1995	DS-103	299/300	P	P	P	Y	V
07/03/1995	DS-104	301/302	P	P	P	Y	V
07/03/1995	DS-105	303/304	P	P	P	Y	V
07/03/1995	DS-106	308/309	P	P	P	Y	V
07/03/1995	DS-107	310/311	P	P	P	Y	V
07/03/1995	DS-108	313/314	P	P	P	Y	V
07/03/1995	DS-109	316/317	P	P	P	Y	V
07/03/1995	DS-110	319/320	P	P	P	Y	V
07/07/1995	DS-111	320/321	P	P	P	Y	V
07/07/1995	DS-112	321/322	P	P	P	Y	V
07/07/1995	DS-113	315/250	P	P	P	Y	V
07/07/1995	DS-114	326/327	P	P	P	Y	V
07/07/1995	DS-115	328/329	P	P	P	Y	V
07/07/1995	DS-116	330/331	P	P	P	Y	V
07/07/1995	DS-117	332/333	P	P	P	Y	V
07/07/1995	DS-118	335/336	P	P	P	Y	V
07/10/1995	DS-119	337/338	P	P	P	Y	V
07/10/1995	DS-120	340/341	P	P	P	Y	V
07/10/1995	DS-121	342/343	P	P	P	Y	V
07/10/1995	DS-122	344/345	P	P	P	Y	V
07/10/1995	DS-123	347/348	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
07/10/1995	DS-124	352/353	P	P	P	Y	V
07/10/1995	DS125	345/317	P	P	P	Y	V
07/10/1995	DS-126	354/353	P	P	P	Y	V
07/10/1995	DS-127	358/359	P	P	P	Y	V
07/10/1995	DS-128	361/332	P	P	P	Y	V
07/10/1995	DS-129	356/360	P	P	P	Y	V
07/17/1995	DS-130	84/386	P	P	P	Y	V
07/17/1995	DS-131	387/388	P	P	P	Y	V
07/17/1995	DS-132	392/389	P	P	P	Y	V
07/17/1995	DS-133	117/389	P	P	P	Y	V
07/17/1995	DS-134	299/364	P	P	P	Y	V
07/17/1995	DS-135	367/368	P	P	P	Y	V
07/17/1995	DS-136	365/371	P	P	P	Y	V
07/17/1995	DS-137	373/375	P	P	P	Y	V
07/17/1995	DS-138	376/377	P	P	P	Y	V
07/17/1995	DS-139	380/381	P	P	P	Y	V
07/17/1995	DS-140	382/383	P	P	P	Y	V
07/17/1995	DS141	307/394	P	P	P	Y	V
07/20/1995	DS-142	395/396	P	P	P	Y	V
07/20/1995	DS-143	397/398	P	P	P	Y	V
07/20/1995	DS-144	399/400	P	P	P	Y	V
07/20/1995	DS-145	401/402	P	P	P	Y	V
07/20/1995	DS-146	403/404	P	P	P	Y	V
07/24/1995	DS-147	405/406	P	P	P	Y	V
07/24/1995	DS-148	407/408	P	P	P	Y	V
07/26/1995	DS-149	410/411	P	P	P	Y	V
07/26/1995	DS-150	412/413	P	P	P	Y	V
07/28/1995	DS-151	414/415	P	P	P	Y	V
07/28/1995	DS-152	417/418	P	P	P	Y	V
07/28/1995	DS-153	420/421	P	P	P	Y	V
07/28/1995	DS-154	423/424	P	P	P	Y	V
07/28/1995	DS-155	428/429	P	P	P	Y	V
07/28/1995	DS-156	430/431	P	P	P	Y	V
07/28/1995	DS-157	413??/432	P	P	P	Y	V
07/28/1995	DS-158	433/434	P	P	P	Y	V
07/28/1995	DS-159	242/436	P	P	P	Y	V
07/28/1995	DS-160	438/439	P	P	P	Y	V
07/28/1995	DS-161	440/442	P	P	P	Y	V
07/28/1995	DS-162	B01/440	P	P	P	Y	V
08/04/1995	DS-163	469/468	P	P	P	Y	V
08/04/1995	DS-164	477/478	P	P	P	Y	V
08/04/1995	DS-165	435/474	P	P	P	Y	V
08/04/1995	DS-166	472/471	P	P	P	Y	V
08/04/1995	DS-167	459/460	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
08/04/1995	DS-168	456/457	P	P	P	Y	V
08/04/1995	DS-169	452/453	P	P	P	Y	V
08/04/1995	DS-170	450/451	P	P	P	Y	V
08/04/1995	DS-171	446/447	P	P	P	Y	V
08/04/1995	DS-172	444/445	P	P	P	Y	V
08/04/1995	DS-173	442/443	P	P	P	Y	V
08/10/1995	DS-174	480/481	P	P	P	Y	V
08/10/1995	DS-175	481/486	P	P	P	Y	V
08/10/1995	DS-176	499/500	P	P	P	Y	V
08/10/1995	DS-177	503/510	P	P	P	Y	V
08/10/1995	DS-178	70/510	P	P	P	Y	V
08/10/1995	DS-179	505/506	P	P	P	Y	V
08/10/1995	DS-180	507/508	P	P	P	Y	V
08/10/1995	DS-181	508/509	P	P	P	Y	V
08/11/1995	DS-182	54/517	P	P	P	Y	V
08/11/1995	DS-183	516/521	P	P	P	Y	V
08/11/1995	DS-184	517/518	P	P	P	Y	V
08/11/1995	DS-185	528/529	P	P	P	Y	V
08/11/1995	DS-186	526/527	P	P	P	Y	V
08/11/1995	DS-187	524/525	P	P	P	Y	V
08/11/1995	DS-188	530/531	P	P	P	Y	V
08/17/1995	DS-189	532/533	P	P	P	Y	V
08/17/1995	DS-190	534/535	P	P	P	Y	V
08/17/1995	DS-191	536/537	P	P	P	Y	V
08/17/1995	DS-192	538/539	P	P	P	Y	V
08/17/1995	DS-193	540/541	P	P	P	Y	V
08/17/1995	DS-194	509/543	P	P	P	Y	V
08/17/1995	DS-195	544/534	P	P	P	Y	V
08/17/1995	DS-196	547/548	P	P	P	Y	V
08/17/1995	DS-197	500/549	P	P	P	Y	V
08/17/1995	DS-198	501/550	P	P	P	Y	V
08/17/1995	DS-199	502/551	P	P	P	Y	V
08/18/1995	DS-200	554/571	P	P	P	Y	V
08/18/1995	DS-201	572/573	P	P	P	Y	V
08/18/1995	DS-202	563/564	P	P	P	Y	V
08/18/1995	DS-203	560/561	P	P	P	Y	V
08/18/1995	DS-204	565/549	P	P	P	Y	V
08/18/1995	DS-205	538/563	P	P	P	Y	V
08/21/1995	DS-206	578/579	P	P	P	Y	V
08/21/1995	DS-207	581/576?	P	P	P	Y	V
08/22/1995	DS-208	548/584	P	P	P	Y	V
08/22/1995	DS-209	583/587	P	P	P	Y	V
08/22/1995	DS-210	588/583	P	P	P	Y	V
08/28/1995	DS-211	473/590	F	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
08/28/1995	DS-212	592/593	P	P	P	Y	V
08/28/1995	DS-213	593/594	P	P	P	Y	V
08/28/1995	DS-214	597/598	F	F	P	Y	V
08/28/1995	DS-215	601/602	P	P	P	Y	V
08/28/1995	DS-216	604/605	P	P	P	Y	V
08/28/1995	DS-217	607/608	?	?	P	Y	V
08/28/1995	DS-218	608/609	P	P	P	Y	V
08/28/1995	DS-219	614/613	P	P	P	Y	V
08/29/1995	DS-211A	4731/590	P	P	P	Y	V
08/29/1995	DS-211B	591 PANEL	P	P	P	Y	V
08/29/1995	DS-217A	607/608	P	P	P	Y	V
08/29/1995	DS-214A	597/598	P	P	P	Y	V
08/29/1995	DS-214B	597/598	P	P	P	Y	V
08/29/1995	DS-217B	610/611	P	P	P	Y	V
09/01/1995	DS-220	475/616	P	P	P	Y	V
09/01/1995	DS-221	619/620	P	P	P	Y	V
09/01/1995	DS-222	620/621	P	P	P	Y	V
09/01/1995	DS-223	622/623	P	P	P	Y	V
09/01/1995	DS-224	626/627	P	P	P	Y	V
09/01/1995	DS-225	627/628	P	P	P	Y	V
09/01/1995	DS-226	601/628	P	P	P	Y	V
09/01/1995	DS-227	630/631	P	P	P	Y	V
09/01/1995	DS-228	631/632	P	P	P	Y	V
09/01/1995	DS-229	76/641	P	P	P	Y	V
09/01/1995	DS-230	647/648	P	P	P	Y	V
09/01/1995	DS-231	644/651	P	P	P	Y	V
09/01/1995	DS-232	17/650	P	P	P	Y	V
09/05/1995	DS-233	634/638	P	P	P	Y	V
09/05/1995	DS-234	63/63???	P	P	P	Y	V
09/08/1995	DS-235	589/653	P	P	P	Y	V
09/08/1995	DS-236	654/655	P	P	P	Y	V
09/08/1995	DS-237	659/660	P	P	P	Y	V
09/08/1995	DS-238	663/664	P	P	P	Y	V
09/08/1995	DS-239	576/668	P	P	P	Y	V
09/08/1995	DS-240	653/671	P	P	P	Y	V
09/08/1995	DS-241	671/672	P	P	P	Y	V
09/13/1995	DS-242	672/673	P	P	P	Y	V
09/13/1995	DS-243	676/677	P	P	P	Y	V
09/13/1995	DS-244	680/681	P	P	P	Y	V
09/13/1995	DS-245	684/685	P	P	P	Y	V
09/13/1995	DS-246	664/682	P	P	P	Y	V
09/13/1995	DS-247	658/676	P	P	P	Y	V
09/13/1995	DS-248	686/687	P	P	P	Y	V
09/13/1995	DS-249	690/691	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
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HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
09/13/1995	DS-250	695/696	P	P	P	Y	V
09/13/1995	DS-251	697/698	P	P	P	Y	V
09/13/1995	DS-252	702/703	P	P	P	Y	V
09/13/1995	DS-253	654/693	P	P	P	Y	V
09/13/1995	DS-254	705/706	P	P	P	Y	V
09/13/1995	DS-255	507/706	P	P	P	Y	V
09/19/1995	DS-256	545/701	P	P	P	Y	V
09/19/1995	DS-257	615/710	P	P	P	Y	V
09/19/1995	DS-258	712/713	P	P	P	Y	V
09/19/1995	DS-259	718/719	P	P	P	Y	V
09/22/1995	DS-260	634/720	P	P	P	Y	V
09/22/1995	DS-261	635/720	P	P	P	Y	V
09/22/1995	DS-262	724/722	F	F	P	Y	V
09/22/1995	DS-263	728/729	P	P	P	Y	V
09/22/1995	DS-264	719/730	P	P	P	Y	V
09/27/1995	DS-265	706/731	P	P	P	Y	V
09/27/1995	DS-266	51/52	P	P	P	Y	V
09/27/1995	DS-267	5/4-5/5	P	P	P	Y	V
09/27/1995	DS-268	57/59	P	P	P	Y	V
09/27/1995	DS-269	51/510	P	P	P	Y	V
09/27/1995	DS-270	59/52	P	P	P	Y	V
09/27/1995	DS-271	512/514	P	P	P	Y	V
09/27/1995	DS-272	731/520	P	P	P	Y	V
09/27/1995	DS-273	525/526	P	P	P	Y	V
09/27/1995	DS-274	528/530	P	P	P	Y	V
09/27/1995	DS-262A	722/724	F	F	P	Y	V
09/27/1995	DS-262B	722/724	P	P	P	Y	V
09/28/1995	DS-262C	722/724	F	F	P	Y	V
09/28/1995	DS-262D	723/723	P	P	P	Y	V
09/28/1995	DS-262E	715/716	P	P	P	Y	V
09/28/1995	DS-275	530/531	P	P	P	Y	V
09/28/1995	DS-276	533/534	P	P	P	Y	V
09/28/1995	DS-277	537/538	P	P	P	Y	V
09/29/1995	DS-278	S36-692	P	P	P	Y	V
10/03/1995	DS-279	685/745	P	P	P	Y	V
10/03/1995	DS-280	747/748	P	P	P	Y	V
10/03/1995	DS-281	752/753	P	P	P	Y	V
10/03/1995	DS-282	756/757	P	P	P	Y	V
10/03/1995	DS-283	759/760	P	P	P	Y	V
10/03/1995	DS-284	764/765	P	P	P	Y	V
10/03/1995	DS-285	767/768	P	P	P	Y	V
10/03/1995	DS-286	772/771	P	P	P	Y	V
10/11/1995	DS-287	217/540	P	P	P	Y	V
10/11/1995	DS-288	59/540	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
10/11/1995	DS-289	510/551	P	P	P	Y	V
10/11/1995	DS-290	539/541	P	P	P	Y	V
10/11/1995	DS-291	544/546	P	P	P	Y	V
10/11/1995	DS-292	560/561	P	P	P	Y	V
10/11/1995	DS-293	557/558	P	P	P	Y	V
10/11/1995	DS-294	562/563	P	P	P	Y	V
10/11/1995	DS-295	565/567	P	P	P	Y	V
10/11/1995	DS-296	569/571	P	P	P	Y	V
10/11/1995	DS-297	573/575	P	P	P	Y	V
10/11/1995	DS-298	802/380	P	P	P	Y	V
10/19/1995	DS-299	195/800	P	P	P	Y	V
10/19/1995	DS-300	808/300	P	P	P	Y	V
10/20/1995	DS-301	812/206	P	P	P	Y	V
10/20/1995	DS-302	811/365	P	P	P	Y	V
10/20/1995	DS-303	813/356	P	P	P	Y	V
10/20/1995	DS-304	814/232	P	P	P	Y	V
10/25/1995	DS-305	39/92	P	P	P	Y	V
10/25/1995	DS-306	94/96	P	P	P	Y	V
10/25/1995	DS-307	100/101	P	P	P	Y	V
10/25/1995	DS-308	105/106	P	P	P	Y	V
10/25/1995	DS-309	110/111	P	P	P	Y	V
10/25/1995	DS-310	353/111	P	P	P	Y	V
10/25/1995	DS-311	112/113	P	P	P	Y	V
10/25/1995	DS-312	115/55	P	P	P	Y	V
11/08/1995	DS-324C	765/829			BLOWN OUT		
10/26/1995	DS-313	115/117	P	P	P	Y	V
10/26/1995	DS-314	120/121	P	P	P	Y	V
10/26/1995	DS-315	126/127	P	P	P	Y	V
10/26/1995	DS-316	130/131	P	P	P	Y	V
10/26/1995	DS-317	135/136	P	P	P	Y	V
10/26/1995	DS-318	133/74	P	P	P	Y	V
10/30/1995	DS-319	159/158	P	P	P	Y	V
10/30/1995	DS-320	130/153	P	P	P	Y	V
10/30/1995	DS-321	145/146	P	P	P	Y	V
10/30/1995	S322	S156/415	F	F	P	Y	V
10/31/1995	DS-322A	414/154	P	P	P	Y	V
10/31/1995	DS-322B	157/415	P	P	P	Y	V
10/31/1995	DS-323	825/826	P	P	P	Y	V
10/31/1995	DS-324C	827/767	F	F	P	Y	V
11/07/1995	DS-324A	828/766	F	F	P	Y	V
11/07/1995	DS-324B	S165/5-138	P	P	P	Y	V
11/03/1995	DS-325	167/169	P	P	P	Y	V
11/03/1995	DS-326	166/168	P	P	P	Y	V
11/03/1995	DS-327	165/167	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
11/03/1995	DS-328	165/167	P	P	P	Y	V
11/03/1995	DS-329	137/165	F	F	P	Y	V
11/16/1995	DS-329A	165/137	F	F	P	Y	V
11/16/1995	DS-329B	165/166	P	P	P	Y	V
11/16/1995	DS-329C	165/38	P	P	P	Y	V
11/03/1995	DS-330	138/165	P	P	P	Y	V
11/03/1995	DS-331	138/165	P	P	P	Y	V
11/03/1995	DS-332	165/166	P	P	P	Y	V
11/03/1995	DS-333	165/166	P	P	P	Y	V
11/07/1995	DS-334	165/166	P	P	P	Y	V
11/03/1995	DS-335	166/168	P	P	P	Y	V
11/16/1995	DS-336	838/763	F	F	P	Y	V
11/16/1995	DS-337	838/839	P	P	P	Y	V
11/16/1995	DS-338	840/842	P	P	P	Y	V
11/16/1995	DS-336A	824/763	F	F	P	Y	V
11/16/1995	DS-336B	842/767	F	F	P	Y	V
11/16/1995	DS-336C	[illegible]	P	P	P	Y	V
11/08/1995	DS-339	166/170	P	P	P	Y	V
11/08/1995	DS-340	170/171	P	P	P	Y	V
11/08/1995	DS-341	172/173	P	P	P	Y	V
11/08/1995	DS-342	S-91/S-174	P	P	P	Y	V
11/08/1995	DS-343	163/179	P	P	P	Y	V
11/08/1995	DS-344	182/184	P	P	P	Y	V
11/16/1995	DS-345	185/186	P	P	P	Y	V
11/16/1995	DS-346	189/190	P	P	P	Y	V
11/16/1995	DS-347	173/191	F	F	P	Y	V
11/16/1995	DS-348	/195/197 EXT PAT	F	F	P	Y	V
11/16/1995	DS-349	198/426	P	P	P	Y	V
11/16/1995	DS-350	202/204	P	P	P	Y	V
11/16/1995	DS-351	208/210	P	P	P	Y	V
11/16/1995	DS-352	209/476	P	P	P	Y	V
11/16/1995	DS-353	204/429	F	F	P	Y	V
11/21/1995	DS-354	478/843	P	P	P	Y	V
11/21/1995	DS-355	846/848	P	P	P	Y	V
11/21/1995	DS-356	853/854	P	P	P	Y	V
11/21/1995	DS-357	847/858	P	P	P	Y	V
11/21/1995	DS-358	857/864	P	P	P	Y	V
11/21/1995	DS-359	619/850	P	P	P	Y	V
11/21/1995	DS-360	857/865	P	P	P	Y	V
11/21/1995	DS-361	866/868	P	P	P	Y	V
11/21/1995	DS-362	868/869	P	P	P	Y	V
11/21/1995	DS-363	866/869	P	P	P	Y	V
11/22/1995	DS-364	S-210/S-211	P	P	P	Y	V
11/22/1995	DS-365	S-216/875	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
11/21/1995	DS-366	867/877	P	P	P	Y	V
11/28/1995	DS-367	842/886	P	P	P	Y	V
11/28/1995	DS-368	768/886	P	P	P	Y	V
11/28/1995	DS-369	887/888	P	P	P	Y	V
11/28/1995	DS-370	S211/S221	P	P	P	Y	V
11/28/1995	DS-371	S217/837	P	P	P	Y	V
11/28/1995	DS-372	889/893	P	P	P	Y	V
11/28/1995	DS-373	5225/889	P	P	P	Y	V
11/28/1995	DS-274	5214/5224	P	P	P	Y	V
11/28/1995	DS-375	885/909	P	P	P	Y	V
11/28/1995	DS-376	/ELL BOOT ON 9(	P	P	P	Y	V
11/28/1995	DS-377	723/912	P	P	P	Y	V
11/28/1995	DS-378	912/913	P	P	P	Y	V
11/28/1995	DS-379	915/916	P	P	P	Y	V
11/28/1995	DS-380	914/915	P	P	P	Y	V
11/30/1995	DS-381	774/923	P	P	P	Y	V
11/30/1995	DS-382	914/928	P	P	P	Y	V
11/30/1995	DS-383	913/928	P	P	P	Y	V
11/30/1995	DS-384	929/930	P	P	P	Y	V
11/30/1995	DS-385	930/931	P	P	P	Y	V
11/30/1995	DS-386	932/933	P	P	P	Y	V
11/30/1995	DS-387	934/935	P	P	P	Y	V
11/30/1995	DS-388	940/941	P	P	P	Y	V
11/30/1995	DS-389	939/940	P	P	P	Y	V
11/30/1995	DS-390	935/936	P	P	P	Y	V
12/08/1995	DS-391	623/943	P	P	P	Y	V
12/08/1995	DS-392	920/948	P	P	P	Y	V
12/08/1995	DS-393	948/949	P	P	P	Y	V
12/06/1995	DS-394	EXT 911 - 942	P	P	P	Y	V
12/08/1995	DS-399	958/926	P	P	P	Y	V
12/08/1995	DS-396	[illegible]	P	P	P	Y	V
12/07/1995	DS-400	959/960	P	P	P	Y	V
12/07/1995	DS-401	962/963	P	P	P	Y	V
12/07/1995	DS-402	964/965	P	P	P	Y	V
12/07/1995	DS-403	966/771	LEFT SAMPLE IN FIELD, EXTRA				
12/07/1995	DS-404	966/967	P	P	P	Y	V
12/08/1995	DS-406	976/977	P	P	P	Y	V
12/08/1995	DS-407	980/981	P	P	P	Y	V
12/08/1995	DS-409	983/984	P	P	P	Y	V
12/07/1995	DS-410	986/987	F	P	P	Y	V
12/06/1995	DS-395	935/952	P	P	P	Y	V
12/06/1995	DS-397		P	P	P	Y	V
12/06/1995	DS-408	745/981	P	P	P	Y	V
12/06/1995	DS-414	668/1000	P	P	P	Y	V

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

HDPE GEOMEMBRANE QA DESTRUCTIVE SEAM FIELD TEST LOG
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

DATE	SAMPLE NUMBER	SEAM	PEAL	SHEAR	REPAIR METHOD *	REPAIR TEST	
						Y/N	TYPE**
12/08/1995	DS-405	970/973	P	P	P	Y	V
12/07/1995	DS-415	1001/1002	P	P	P	Y	V
12/08/1995	DS-410A	986/987	P	P	P	Y	V
12/08/1995	DS-410B	986/987	P	P	P	Y	V
12/06/1995	DS-411	989/990	P	P	P	Y	V
12/08/1995	DS-412	993/994	P	P	P	Y	V
12/08/1995	DS-413	998/999	P	P	P	Y	V
12/07/1995	DS-416	951/1011	P	P	P	Y	V
12/05/1995	DS-398		P	P	P	Y	V
12/07/1995	DS-417	579/1005	P	P	P	Y	V
12/07/1995	DS-418	1010/558	P	P	P	Y	V
12/08/1995	DS-419	1012/1013	P	P	P	Y	V
12/08/1995	DS-420	1018/929	P	P	P	Y	V
12/18/1995	DS-421	573/1041	P	P	P	Y	V
12/18/1995	422	1044/1045	P	P	P	Y	V
12/18/1995	423	521/1049	P	P	P	Y	V
01/03/1996	424		F	F	P	Y	V
01/03/1996	DS-404A	966/967	F	F			
01/03/1996	DS-404B	966/967	F	F			
01/03/1996	DS-411A	989/990	F	F			
01/03/1996	DS-411B	989/990	F	F			
01/03/1996	DS-424A	EXTRUSION P	F	F			
01/03/1996	DS-424B	EXTRUSION P	F	F			

* B-BEAD, P-PATCH, CS-CAP STRIP
** V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

B-8 HDPE Geomembrane Independent Laboratory Seam Strength Testing

Destructive Laboratory Peel and Shear Tests
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

SEAM	MACHINE NUMBER	SAMPLE NUMBER	DATE SAMPLE D	PEEL TEST P=Pass F=Fail	SHEAR TEST P=Pass F=Fail	BREAK TYPE FTB=Film Tear Bond	COMMENTS
2/3	1067	DS-1	5/4/95	P	P	FTB	Adhesion-Break for 3 of 5 Peel tests
6/7	1067	DS-2	5/4/95	P	P	FTB	
16/17	1020	DS-3	5/4/95	P	P	FTB	
19/20	1067	DS-4	5/8/95	P	P	FTB	
21/22	1067	DS-5	5/8/95	P	P	FTB	
23/24	1067	DS-6	5/8/95	P	P	FTB	
25/26	1067	DS-7	5/8/95	P	P	FTB	
30/31	1020	DS-8	5/16/95	P	P	FTB	
27/43	1020	DS-9	5/16/95	P	P	FTB	
29/30	1067	DS-10	5/16/95	P	P	FTB	
43/44	1067	DS-11	5/16/95	P	P	FTB	
44/45	1020	DS-12	5/16/95	P	P	FTB	
46/47	1067	DS-13	5/16/95	P	P	FTB	
18/49	1020	DS-14	5/9/95	P	P	FTB	
50/51	1020	DS-15	5/15/95	P	P	FTB	
51/52	1067	DS-16	5/16/95	P	P	FTB	
53/54	1067	DS-17	5/16/95	P	P	FTB	
55/56	1020	DS-18	5/15/95	P	P	FTB	
56/57	1067	DS-19	5/15/95	P	P	FTB	
57/58	1020	DS-20	5/15/95	P	P	FTB	
63/64	1020	DS-21	5/16/95	P	P	FTB	
62/63	1020	DS-22	5/16/95	P	P	FTB	
60/61	1020	DS-23	5/23/95	P	P	FTB	
55/56	1067	DS-24	5/17/95	P	P	FTB	
19/66	1060	DS-25	5/17/95	P	P	FTB	
69/70	1067	DS-26	5/18/95	P	P	FTB	
71/72	1020	DS-27	5/22/95	P	P	FTB	
74/75	1020	DS-28	5/22/95	P	P	FTB	
76/77	1020	DS-29	5/22/95	P	P	FTB	
84/85	1067	DS-30	5/22/95	P	P	FTB	
87/88	1067	DS-31	5/22/95	P	P	FTB	
90/91	1067	DS-32	5/22/95	P	P	FTB	
93/94	1067	DS-33	5/22/95	P	P	FTB	
96/97	1067	DS-34	5/22/95	P	P	FTB	
107/108	1020	DS-35	5/22/95	P	P	FTB	
100/101	1067	DS-36	5/22/95	P	P	FTB	
105/106	1060	DS-37	5/22/95	P	P	FTB	
117/124	1067	DS-38	-	P	P	FTB	
118/119	1067	DS-39	-	P	P	FTB	
120/88	1060	DS-40	-	P	P	FTB	
125/126	1020	DS-41	5/25/95	P	P	FTB	
127/128	1067	DS-42	5/24/95	P	P	FTB	
129/130	1100	DS-43	-	P	P	FTB	
131/132	1060	DS-44	-	F	P	FTB	Adhesion-Break for 2 of 5 Peel tests

Destructive Laboratory Peel and Shear Tests
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

SEAM	MACHINE NUMBER	SAMPLE NUMBER	DATE SAMPLE D	PEEL TEST P=Pass F=Fail	SHEAR TEST P=Pass F=Fail	BREAK TYPE FTB=Film Tear Bond	COMMENTS
131/132	1060	DS-44A	5/24/95	P	P	FTB	
131/132	1060	DS-44C	5/24/95	F	P	FTB	Adhesion-Break for 4 of 5 Peel tests
134/135	1060	DS-44E	5/24/95	P	P	FTB	
133/134	1100	DS-45	-	P	P	FTB	
135/136	1067	DS-46	-	P	P	FTB	
137/138	1100	DS-47	-	P	P	FTB	
98/95	278	DS-48	5/31/95	P	P	FTB	
139/140	1060	DS-49	5/31/95	P	P	FTB	
140/141	1100	DS-50C	5/25/95	P	P	FTB	
116/151	1100	DS-50D	5/30/95	F	P	FTB	Adhesion-Break for 3 of 5 Peel tests
143/157	1100	DS-51	5/31/95	P	P	FTB	
158/159	1067	DS-52	5/31/95	P	P	FTB	
116/151	1100	DS-53	5/31/95	P	P	FTB	
155/156	1067	DS-54	5/31/95	P	P	FTB	
74/77	278	DS-55	6/1/95	P	P	FTB	
156/161	1100	DS-56	6/1/95	P	P	FTB	
162/163	1067	DS-57	6/1/95	P	P	FTB	
164/165	1060	DS-58	6/1/95	P	P	FTB	
166/167	1067	DS-59	6/1/95	P	P	FTB	
168/169	1100	DS-60	6/1/95	P	P	FTB	
170/171	1060	DS-61	6/1/95	P	P	FTB	
172/173	1067	DS-62	6/1/95	P	P	FTB	
-	1067	DS-63	6/2/95	P	P	FTB	
180/181	1060	DS-64	6/2/95	P	P	FTB	
184/185	1100	DS-65	6/2/95	P	P	FTB	
183/184	1060	DS-66	6/2/95	P	P	FTB	
178/179	1100	DS-67	6/2/95	P	P	FTB	
186/193	1100	DS-68	6/5/95	P	P	FTB	
175/187	1100	DS-69	6/5/95	P	P	FTB	
188/189	1100	DS-70	6/5/95	P	P	FTB	
190/191	1100	DS-71	6/5/95	P	P	FTB	
205/207	1100	DS-72	6/8/95	P	P	FTB	
208/209	1060	DS-73	6/8/95	P	P	FTB	
213/214	1067	DS-74	6/9/95	P	P	FTB	
217/218	1100	DS-75	6/9/95	P	P	FTB	
219/220	1060	DS-76	6/9/95	P	P	FTB	
221/222	1067	DS-77	6/9/95	P	P	FTB	
157/223	1100	DS-78	6/9/95	P	P	FTB	
225/226	1100	DS-79	6/16/95	P	P	FTB	
227/228	1060	DS-80	6/16/95	P	P	FTB	
229/230	1067	DS-81	6/16/95	P	P	FTB	
230/231	1060	DS-82	6/16/95	P	P	FTB	
233/234	1067	DS-83	6/19/95	P	P	FTB	
236/238	1100	DS-84	6/19/95	P	P	FTB	

Destructive Laboratory Peel and Shear Tests
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

SEAM	MACHINE NUMBER	SAMPLE NUMBER	DATE SAMPLE D	PEEL TEST P=Pass F=Fail	SHEAR TEST P=Pass F=Fail	BREAK TYPE FTB=Film Tear Bond	COMMENTS
240/237	1100	DS-85	6/19/95	P	P	FTB	
242/243	1100	DS-86	6/21/95	P	P	FTB	
244/245	1060	DS-87	6/21/95	P	P	FTB	
246/247	1067	DS-88	6/21/95	P	P	FTB	
250/251	1060	DS-89	6/21/95	P	P	FTB	
255/256	1060	DS-90	6/21/95	P	P	FTB	
217/258	1100	DS-91	6/28/95	P	P	FTB	
259/260	1067	DS-92	6/28/95	P	P	FTB	
262/265	1060	DS-93	6/28/95	P	P	FTB	
263/264	1100	DS-94	6/28/95	P	P	FTB	
65/271	1060	DS-95	6/28/95	P	P	FTB	
275/273	1067	DS-96	6/28/95	P	P	FTB	
257/287	1100	DS-97	6/30/95	P	P	FTB	
288/289	1084	DS-98	6/30/95	P	P	FTB	
290/291	1067	DS-99	6/30/95	P	P	FTB	
292/293	1084	DS-100	6/30/95	P	P	FTB	
294/295	1100	DS-101	6/30/95	P	P	FTB	
298/297	1100	DS-102	6/30/95	P	P	FTB	
299/300	1084	DS-103	6/30/95	P	P	FTB	
301/302	1100	DS-104	6/30/95	P	P	FTB	
303/304	1084	DS-105	6/30/95	P	P	FTB	
308/309	1084	DS-106	6/30/95	P	P	FTB	
310/311	1100	DS-107	7/3/95	P	P	FTB	
316/317	1067	DS-109	7/3/95	P	P	FTB	
319/320	1162	DS-110	7/3/95	P	P	FTB	
332/333	1100	DS-117	7/6/95	P	P	FTB	
352/353	-	DS-124	7/7/95	P	P	FTB	
387/388	1084	DS-131	7/14/95	P	P	FTB	
377/376	1084	DS-138	7/13/95	P	P	FTB	
401/402	1084	DS-145	7/20/95	P	P	FTB	
417/418	1084	DS-152	7/25/95	P	P	FTB	
242/436	1162	DS-159	7/27/95	P	P	FTB	
477/478	1100	DS-164	8/3/95	P	P	FTB	
447/446	1100	DS-171	8/1/95	P	P	FTB	
S24/S25	1162	DS-178	8/10/95	P	P	FTB	
70/S10	1100	DS-185	8/9/95	P	P	FTB	
S38/S39	1162	DS-192	8/15/95	P	P	FTB	
S02/S51	1067	DS-199	8/16/95	P	P	FTB	
S78/S79	1067	DS-206	8/18/95	P	P	FTB	
604/605	1067	DS-216	8/25/95	P	P	FTB	
622/623	1162	DS-223	8/30/95	P	P	FTB	
17/650	1067	DS-232	8/31/95	P	P	FTB	
671/672	1100	DS-241	9/8/95	P	P	FTB	
658/676	1100	DS-247	9/11/95	P	P	FTB	

Destructive Laboratory Peel and Shear Tests
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

SEAM	MACHINE NUMBER	SAMPLE NUMBER	DATE SAMPLE D	PEEL TEST P=Pass F=Fail	SHEAR TEST P=Pass F=Fail	BREAK TYPE FTB=Film Tear Bond	COMMENTS
705/706	1100	DS-255	9/13/95	P	P	FTB	
635/720	1162	DS-261	9/19/95	P	P	FTB	
1/10	1067	DS-269	9/21/95	P	P	FTB	
33/34	1067	DS-276	9/28/95	P	P	FTB	
759/760	-	DS-283	10/2/95	P	P	FTB	
39/41	-	DS-290	10/10/95	P	P	FTB	
73/75	-	DS-297	10/11/95	P	P	FTB	
814/232	1162	DS-304	10/19/95	P	P	FTB	
112/113	1067	DS-311	10/24/95	P	P	FTB	
133/74	1162	DS-318	10/25/95	P	P	FTB	
825/826	1025	DS-323	10/30/95	P	P	FTB	
165/167	1025	DS-328	11/3/95	P	P	FTB	
168/166	1067	DS-335	11/6/95	P	P	FTB	
91/174	1025	DS-342	11/6/95	P	P	FTB	
198/426	1025	DS-349	11/10/95	P	P	FTB	
853/854	1151	DS-356	11/17/95	P	P	FTB	
867/869	1025	DS-363	11/18/95	P	P	FTB	
211/221	1067	DS-370	11/22/95	P	P	FTB	
BOOT/909	63	DS-377	11/25/95	P	P	FTB	
913/928	1219	DS-383	11/27/95	P	P	FTB	
936/935	1162	DS-390	11/28/95	P	P	FTB	
956/957	1067	DS-397	12/1/95	P	P	FTB	
966/967	1151	DS-404	12/4/95	P	P	FTB	Adhesion-Break for 2 of 5 Peel Tests
-	-	DS-404C	4/15/96	P	P	FTB	
989/990	1011	DS-411	12/5/95	F	P	FTB	2 of 5 tests not FTB for Peel Tests
-	-	DS-411C	4/15/96	P	P	FTB	
-	-	DS-411E	4/15/96	P	P	FTB	
-	-	DS-414F	4/15/96	P	P	FTB	
1010/558	-	DS-418	12/6/95	P	P	FTB	
p35/patch	-	DS-424C	5/2/96	P	P	FTB	
p42/1025	-	DS-424D	5/2/96	P	P	FTB	
1/2	W 1016	DSR-1	5/20/96	P	P	FTB	
195/10	W 1016	DSR-2	5/20/96	P	P	FTB	
18/211	W 1016	DSR-3	5/20/96	P	P	FTB	
79/25	W 1016	DSR-4	5/22/96	P	P	FTB	
776/28	W 1150	DSR-5	5/22/96	P	P	FTB	
21/22	W 1016	DSR-6	5/22/96	P	P	FTB	
32/152	W 1016	DSR-10	5/28/96	P	P	FTB	
63/64	W 2010	DSR-16	5/28/96	P	P	FTB	

B-9 Backup Information on Damaged HDPE Geomembrane Area

BRECO MECHANICAL GROUP, INC.
201 Saw Mill River Road
YONKERS, NEW YORK 10701

(914) 963-3850
(914) 963-3600

LETTER OF TRANSMITTAL

DATE	JOB NO.
5/16/96	876HP

ATTENTION

RE:

TO WARREN GORDON, P.E.
NYC-DEP

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☑ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ TOP DAMAGE / REPAIR AREA

COPIES	DATE	NO.	DESCRIPTION
1		3	PLAN / AGTEK GENERATED SURVEY PERFORMED 5/13/96 BY K. SULLIVAN & J. HUMMEL.

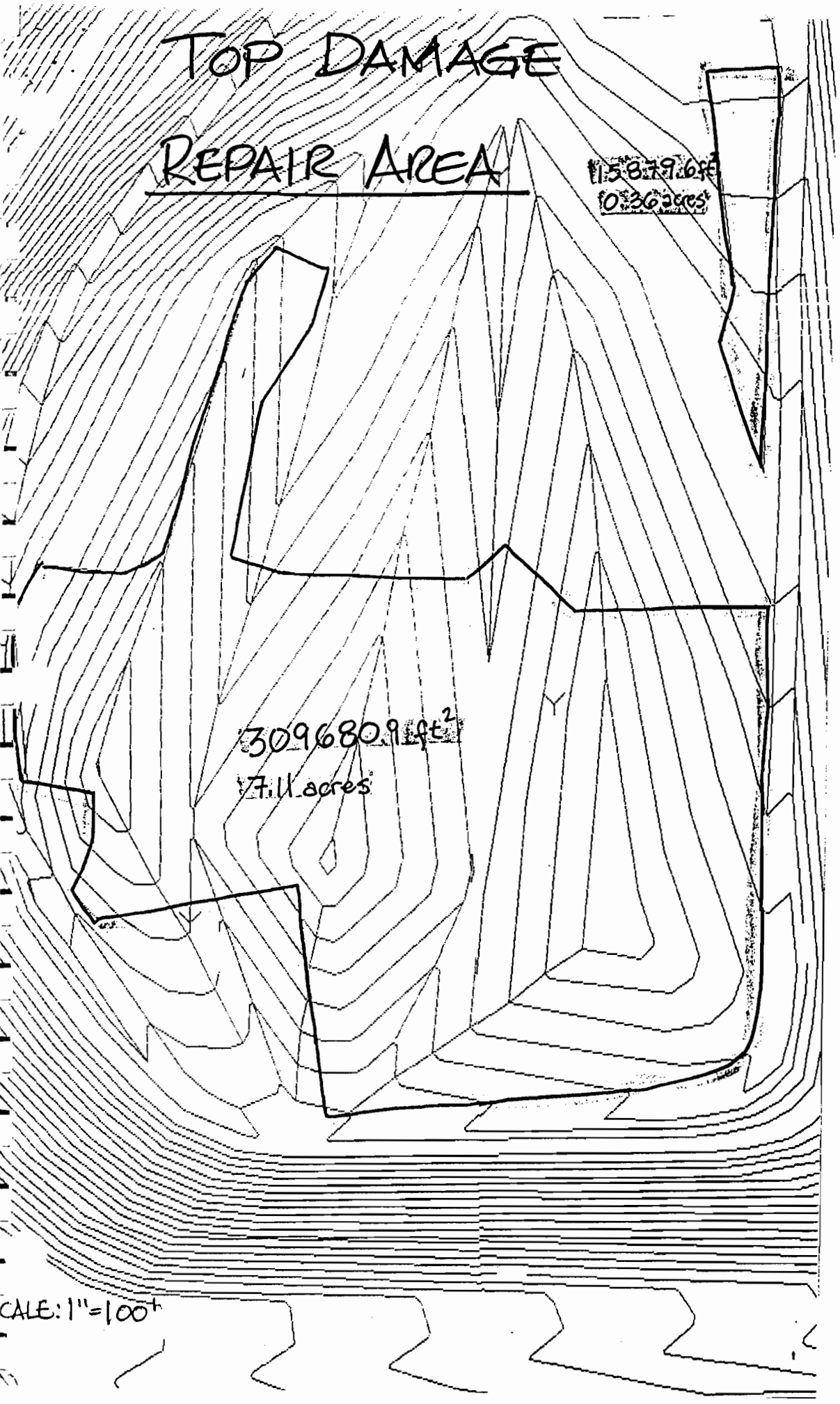
THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO FILE

SIGNED: Mike Kant


TOP DAMAGE
REPAIR AREA
15879.6ft²
0.36acres
3096809ft²
71.11acres
SCALE: 1"=100'

GSE™
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 713-875-6010

29 April, 1996

Breco Mechanical Group, Inc.
210 Saw Mill River Road
Yonkers, NY 10701
Fax: 914/963-3989

Attn: Mark SanAngelo

Re: Repair at Pelham Bay Landfill
Revision to (8 April) Procedure

We have received the comments from NYCDEP (dated 25 April) and Woodward-Clyde (dated 24 April). to our proposed test protocol dated 8 April. It seems that everyone has a little different perspective on how to approach this issue and we are happy to assist in the coordination of this task. We appreciate everyone's input and have incorporated those concerns into this revision of the procedure.

SAMPLE COLLECTION

GSE will provide qualified personnel (hereafter: GSE Inspector) to observe the areas marked as questionable and to then progress into the currently acceptable regions. As the Inspector walks toward the unaffected areas, a spot will be chosen which is likely to be in satisfactory condition. A one square foot sample will be taken at that spot and the underlying composite material, if present, observed. If there is evidence of *any* damage under the liner, another sample will be taken five feet away (in the direction opposite the damage). This will continue until a sample that is visually acceptable is obtained. That sample will then be numbered (#1-GSE, for example), the manufacturing machine direction marked, and its location marked on a site drawing. In addition, an adjacent one square foot sample will be taken and numbered (#1-NYCDEP) for archive purposes.

The next sample will be taken approximately 50 feet away, around the perimeter of the (visually established) unacceptable area. Again, a visual judgment will be made and another set of samples cut and labeled (#2-GSE and #2-NYCDEP). In this fashion, a series of samples (#4 - 7?) will be cut for physical property testing. Please see the attached sketch for a visual explanation of this procedure.

FIELD TESTING

1" x 6" strip specimens will be prepared and tensile tested. Each sample will have two of these specimens cut in the machine direction and two cut in the cross direction. These four specimens will be tested on the field tensiometer for tensile yield strength and break strength. This is

achieved by, activating the "Hold" or "Peak" function on the tensiometer and observing the readout throughout the entire test. The test results will be averaged and compared to the project requirements (120 lb for yield and 225 lb for break).

Averaging of test results is appropriate and typical in the geosynthetics industry since variability in the material, in particular the textured liner, is normal. As such, a single value lower than the requirement is quite possible; however, that would not indicate the sample is unacceptable for serving as a containment barrier. Further, the original project specifications do not restrict averaging of test values. Therefore, GSE believes that averaging of test data (both field and laboratory) is appropriate and acceptable for this procedure.

If the sample does fail, it shall be rejected and retested (five feet out from the failed sample). When a passing sample is identified, it will be forwarded to GSE's Laboratory for conformation testing.

LABORATORY TESTING

The following table summarizes what tests will be performed in the GSE Lab, the minimum allowable values and the testing particulars.

Property	Method	Smooth	Textured	Test(s) Per Sample
Thickness (mil)	ASTM D 1693	60±10%	60±10%	5
Tensile Properties	ASTM D 638			
Yield Stress (lb/in)		130	130	1 MD and 1 CD
Yield Strain (%)	1.3" Gauge Length	13	13	1 MD and 1 CD
Break Stress (lb/in)		243	75	1 MD and 1 CD
Break Strain (%)	2.0" Gauge Length	500	150	1 MD and 1 CD
Tear (lb)	ASTM D 1004	40	45	1 MD and 1 CD
Puncture (lb)	FTMS 101, Meth. 2065	60	60	1
Dimensional Stability (% change)	ASTM D 1204	±3	±3	1 MD and 1 CD
Specific Gravity (g/cc)	ASTM D 792/D 1505	0.93		
Oxidative Induction Time, OIT (minutes)	ASTM D 3895, 200°C, 1 atmosphere	100	100	1
Notched Constant Tensile Load stress crack, NCTL (hours)	ASTM D 5397, single point	200	N/A	1 CD

If a sample does not meet any one of the above requirements, another set of samples (one for testing and one for archiving) will be obtained from the field (labeled #1A-GSE and #1A-NYCDEP) at the appropriate location and tested for all parameters listed above. If that sample fails, the routine will be repeated (samples labeled #1B, #1C and so on) until satisfactory material is reached.

In order to better guarantee the long term performance of the material, GSE will perform OIT and NCTL testing. The OIT test provides an indication of the resistance of the material to degradation due to oxidation. Since the material has been subjected to oxidative degradation (fire is an oxidation reaction), GSE will perform such testing. The NCTL test is to be performed in lieu of the environmental stress crack (ASTM D 1693) test that is mentioned in the project specifications. NCTL testing is a more advanced and rigorous test than ASTM D 1693 for determining a geomembranes resistance to stress cracking. Also, it is a much shorter test -- 200 hours versus 2000 hours.

The following paragraphs explain why various tests that are in the project specifications do not appear in the table above. GSE respects the suggestion that all job-specified properties are to be included in this procedure, however, some of those tests are not appropriate for HDPE geomembranes. They were tested on the material prior to deployment to meet contractual requirements. However, we are now in a position where judicious reasoning and explanations will be to everyone's advantage. Please be aware that GSE's number one priority is to insure long-term environmental containment. The repair efforts at Pelham bay are no different in this regard.

Please be advised that modulus of elasticity (MOE) is no longer performed routinely by GSE's (formally Gundle) Manufacturing Quality Assurance Laboratory to approve material for shipment. There is a great amount of uncertainty regarding the appropriateness of this test. MOE is determined from tensile testing. According to ASTM D 638 (Standard Test Method for Tensile Properties of Plastics), MOE is defined as "the ratio of stress (nominal) to corresponding strain below the proportional limit of a material. It is expressed in force per unit area, usually pounds-force per square inch (megapascals) (Also known as *elastic modulus* or *Young's modulus*)." This definition is followed by, "since the existence of a true proportional limit in plastics is debatable, the propriety of applying the term "modulus of elasticity" to describe the stiffness or rigidity of a plastic has been seriously questioned." The final statement is, "such a constant is useful if its arbitrary nature and dependence on time, temperature, and other factors are realized."

It is therefore evident that there is a great amount of uncertainty in MOE testing and interpretation. Further, MOE is misunderstood by some specification writers who do not realize that a high modulus generally means a membrane is stiffer than membrane with a lower MOE. The elastic modulus is therefore not a useful design parameter for geomembrane applications.

The uncertainty regarding MOE testing has been resolved with NSF International by omitting it from their required material properties for HDPE sheet. Due to the factors mentioned above, GSE does not propose to include MOE testing in this test procedure.

In a similar fashion, soil burial testing is not included in this test program. The test was originally developed for geomembranes that contain cellulose scrim as a reinforcement component; cellulose is subject to microbiological attack. It was also found that various chemical plasticizers and fillers such as those found in PVC geomembranes are also susceptible to microbiological attack. All currently produced polyethylene geomembranes are unsupported (i.e. do not contain scrim) and are unplasticized and unfilled. Therefore, the soil burial test does not affect the material, if performed properly. As a result of this, NSF no longer requires soil burial testing for HDPE geomembranes. Because of the aforementioned issues, and the fact that the test takes more than 30 days, GSE does not intend on including soil burial in this test procedure.

The next test that appears in the project specifications and not this test procedure is melt index. Often, melt flow is a required specification for lining products. However, this is not an appropriate specification. A material's melt flow characteristics have always been a concern to plastics manufacturers since there are so many specific types of resins available. This is the case in all plastic products from surgical tubing to plastic bottles. Geosynthetics is the only plastics industry GSE is aware of that sees melt flow in material specifications. It seems that it was developed as a marketing tool for the various manufacturers and is now so common, it is considered "normal". However, we must realize that the performance properties of a plastic material is not impacted in any way by the resin's melt flow properties. In light of this, it is GSE's opinion that melt index testing will not provide any technically useful information in the Pelham Bay issue.

✓ Low temperature brittleness is also being excluded from this test procedure. It is GSE's opinion that the test will not provide any useful data. We do not believe this to be a property affected by the damage incurred at Pelham Bay that will not be evidenced in the tests that will be performed. If a serious question arises, GSE is open to performing a limited amount of such testing to illustrate this point.

Carbon black content is excluded from the list of tested properties since it cannot be altered without the material being completely combusted. Since the carbon particles are on the order of five microns in diameter, there is no way to adversely affect the carbon content without *severe* damage to the product.

REPAIR BOUNDARY PLACEMENT

Once testing has been completed, the repair boundary will be marked and cut. Marking will involve using a suitable marking device to draw lines between (passing) sample locations. Before placement of new material, the authorized GSE Inspector will observe all underlying material at the cut interfaces to check for damage between the 50-foot spaced samples. If the Inspector finds any questionable area, he has the authority to remark the boundary. Throughout this work, the GSE Inspector will be encouraged to photograph any and all areas being inspected for historical recordkeeping purposes.

In addition to the GSE Inspector, Brecco or NYCDEP is welcome to have a representative present to observe the boundaries and document whatever information may be needed.

If anyone has any comments, questions or anything to add on this procedure, please call or fax so we may discuss. GSE is committed to working with you on this issue and will do everything we can to facilitate a high-quality repair job.

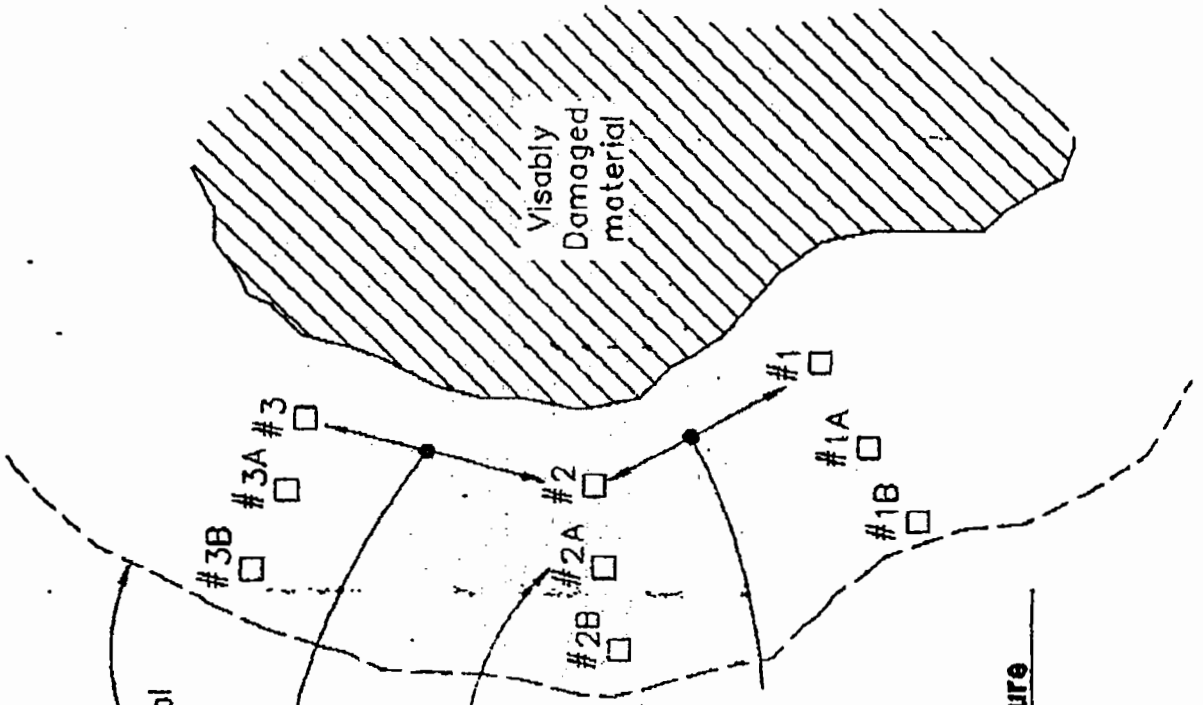
Regards,

Matthew W. Adams
Technical Service

CC: R. Zunker

GSE Lining Technology, Inc.
19103 Gundle Road
Houston, Texas 77073-3598
(800)435-2008 / (713)443-8564

DRAWN	DATE	REVISION	DWG. NO.
Dan	04/08/96	0	MATT006



Example Of Sampling Procedure

Pelham Bay Landfill Cap

(Not to scale)

BRECO MECHANICAL GROUP, INC.
201 SAW MILL RIVER ROAD
YONKERS, NEW YORK 10701

*TEL. (914) 963-3600 * FAX (914) 963-3989*

May 23, 1996

Mr. Roy Durig, P.E.
Chief - Landfill Remediation
New York City Department of
Environmental Protection
96-05 Horace Harding Expressway
5th Floor - Lefrak Plaza
Corona, New York 11368

Re: Pelham Bay Landfill Closure
Contract No. 876-HP
Letter No. 76

Dear Mr. Durig,

Attached please find GSE's letter dated 5/22/96 detailing their schedule for liner repair. This schedule is weather dependent. Also attached are the test results for the samples taken to delineate the extent of damage.

Very Truly Yours,
BRECO MECHANICAL GROUP, INC.

Mark SanAngelo
Project Manager

Enc.

cc: P. Zoltanesky Jr.
P. Smith/J. Jarahari
W. Gordon
A. Ciancia
S. Mokbel

MS/jc
Durig.523

GSE™
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 713-875-6010

May 22, 1996

Breco Mechanical Group, Inc.
201 Saw Mill River Road
Yonkers, New York 10701

Attn: Mark SanAngelo.

Re: Pelham Bay Landfill
GSE Project No. XA4790
Schedule of Work

Dear Mark,

GSE Lining Technology, Inc. provides the following schedule for the above referenced project.

Schedule:

1. Laboratory Testing of Samples - two weeks - complete May 22, 1996
2. Liner disposal - two dumpsters per day - complete May 24, 1996
3. Liner deployment / replacement - one acre per day - complete June 21, 1996
4. As-built drawing - upon completion of project

I have included a copy of the test results with this letter.

Sincerely,

Ronald Zunker, Jr.
Project Manager
Installation Services

enclosure

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
1	Pass	5/8/96	S	143	165	19	19	256	295	729	809	54	52
2	Pass	5/8/96	S	168	166	18	15	305	287	777	793		
3	Pass	5/8/96	S	153	148	20	16	277	255	794	793	49	54
4	Pass	5/8/96	S	171	164	17	16	291	280	743	769		
5	Pass	5/8/96	S	146	160	18	17	249	303	704	853		
6	Pass	5/8/96	S	168	166	21	18	258	262	675	759	52	61
7	Pass	5/8/96	S	163	160	19	17	264	244	685	720	49	55
8	Pass	5/8/96	S	162	161	21	16	314	309	806	853		
9	Pass	5/8/96	S	153	148	18	16	317	287	835	816		
10	Pass	5/8/96	T	155	169	20	16	275	300	772	830		
11	Pass	5/8/96	S	151	151	18	17	311	284	837	828		
12	Pass	5/8/96	S	157	168	18	18	298	298	791	817		
13	Pass	5/8/96	S	169	162	20	16	289	264	756	760		
14	Pass	5/8/96	S	166	166	18	18	298	254	764	709		
15	Pass	5/8/96	S	162	163	19	15	294	270	782	792	52	58
16	Pass	5/8/96	S	154	176	18	18	270	302	738	804		
17	Pass	5/8/96	S	160	171	20	16	315	282	887	812		
18	Pass	5/8/96	S	155	171	17	18	285	314	798	853		
19	Pass	5/8/96	S	158	178	18	17	303	324	827	897	52	56

Report By:
Melody Adams
Nathan Ives

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield CD [%]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance CD [lb.]
20	Pass	5/8/96	S	152	157	19	16	276	293	768	857		
21	Pass	5/8/96	S	149	178	20	17	278	288	809	794		
22	Pass	5/8/96	S	158	176	17	17	304	337	821	903		
23	Pass	5/8/96	S	175	169	19	17	312	289	767	809	53	56
24	Pass	5/8/96	S	155	168	17	17	255	320	689	856		
25	Pass	5/8/96	S	156	158	20	16	275	284	728	804		
26	Pass	5/8/96	S	155	165	20	17	285	342	766	914	53	58
27	Pass	5/8/96	S	169	178	17	17	255	296	744	818		
28	Pass	5/8/96	S	163	177	17	17	253	268	705	760		
29	Pass	5/8/96	S	195	172	15	16	293	313	753	824		
30	Pass	5/8/96	S	178	155	16	17	290	292	794	798	53	53
31	Pass	5/8/96	S	181	161	17	17	267	271	746	765		
32	Pass	5/8/96	S	180	167	14	16	281	310	768	805		
33	Pass	5/8/96	T	180	182	16	17	193	209	541	604	49	50
34	Pass	5/8/96	T	178	182	17	16	155	154	416	461	55	52
35	Pass	5/8/96	T	168	172	16	16	180	181	504	519		
36	Pass	5/8/96	T	165	172	17	17	185	177	516	511	52	47
37	Pass	5/8/96	T	164	164	16	16	120	112	393	318		
38	Pass	5/8/96	T	182	175	16	17	182	207	489	553		

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	CD [%]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	CD [lb.]
39	Pass	5/8/96	T	160	164	17	17	102	157	416	501	55	51
40	Pass	5/8/96	T	170	179	17	16	194	113	576	440		
41	Pass	5/8/96	T	174	178	16	15	132	142	220	449		
42	Pass	5/8/96	T	164	175	17	16	202	128	560	418		
43	Pass	5/8/96	T	172	165	17	16	193	124	564	529		
44	Pass	5/8/96	T	169	179	17	14	164	178	475	544		
45	Pass	5/8/96	T	171	175	17	16	175	130	483	269	54	49
46	Pass	5/8/96	T	173	170	18	16	166	171	516	480		
47	Pass	5/8/96	S	191	161	15	16	296	282	779	786		
48	Pass	5/8/96	S	155	161	16	15	240	265	703	790		
49	Pass	5/8/96	S	170	185	16	14	280	292	734	770	54	52
50	Pass	5/8/96	S	175	187	16	14	290	303	765	810		
51	Pass	5/8/96	S	167	173	16	14	285	289	774	803		
52	Pass	5/8/96	S	173	168	17	15	272	277	730	798		
53	Pass	5/8/96	S	156	160	17	17	242	257	705	761		

Report By:
Melody Adams
Nathan Ivy.

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
1	Pass	5/8/96	S	92	-0.17	-0.15	0.95	150	<-40	59
2	Pass	5/8/96	S							62
3	Pass	5/8/96	S	92	0.1	0.08	0.95	150	<-40	58
4	Pass	5/8/96	S							61
5	Pass	5/8/96	S							59
6	Pass	5/8/96	S	104	0.15	0.25	0.95	150	<-40	61
7	Pass	5/8/96	S	102	-0.07	-0.15	0.95	150	<-40	61
8	Pass	5/8/96	S							60
9	Pass	5/8/96	S							60
10	Pass	5/8/96	T							60
11	Pass	5/8/96	S							59
12	Pass	5/8/96	S							59
13	Pass	5/8/96	S							61
14	Pass	5/8/96	S							62
15	Pass	5/8/96	S	101	-0.08	0.07	0.95	150	<-40	60
16	Pass	5/8/96	S							62
17	Pass	5/8/96	S							60
18	Pass	5/8/96	S							61
19	Pass	5/8/96	S	89	-0.15	-0.37	0.95	150	<-40	61

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
20	Pass	5/8/96	S							60
21	Pass	5/8/96	S							60
22	Pass	5/8/96	S							61
23	Pass	5/8/96	S	97	-0.23	-0.1	0.95	150	<-40	62
24	Pass	5/8/96	S							60
25	Pass	5/8/96	S							60
26	Pass	5/8/96	S	106	0.17	-0.35	0.95	150	<-40	62
27	Pass	5/8/96	S							62
28	Pass	5/8/96	S							60
29	Pass	5/8/96	S							63
30	Pass	5/8/96	S	102	0.42	0.12	0.95	126	<-40	61
31	Pass	5/8/96	S							61
32	Pass	5/8/96	S							62
33	Pass	5/8/96	T	111	0.25	0.02	0.95	112	<-40	63
34	Pass	5/8/96	T	101	0.12	0.1	0.95	103		63
35	Pass	5/8/96	T							62
36	Pass	5/8/96	T	96	0.12	0.05	0.95	174	<-40	61
37	Pass	5/8/96	T							64
38	Pass	5/8/96	T							65

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Report Date: 5/21/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
39	Pass	5/8/96	T	97	0.02	0.2	0.95	152	<-40	63
40	Pass	5/8/96	T							62
41	Pass	5/8/96	T							61
42	Pass	5/8/96	T							63
43	Pass	5/8/96	T							64
44	Pass	5/8/96	T							62
45	Pass	5/8/96	T	101	-0.13	0.2	0.95	124	<-40	63
46	Pass	5/8/96	T							63
47	Pass	5/8/96	S							59
48	Pass	5/8/96	S							56
49	Pass	5/8/96	S	95	-0.18	0.33	0.95	133	<-40	66
50	Pass	5/8/96	S							60
51	Pass	5/8/96	S							58
52	Pass	5/8/96	S							60
53	Pass	5/8/96	S							60

Report By:
Melody Adams
Nathan Ivy

FAX TRANSMITTAL SHEET

FOR ANY QUESTIONS CALL ME AT 829 3255

THE FOLLOWING SHEET - (INCLUDING THIS FAX COVER SHEET)

ARE TO BE DELIVERED TO: Mark SanAngelo

COMPANY: Breco.

DEPARTMENT:

FAX NUMBER:

COMMENTS: #7 is my only Question. Also attached is the sample ~~etc~~ we would like to test

FROM: Allan Gorlin.

PELHAM BAY LANDFILL
GSE PROJECT NO. XA4790
TEST SAMPLES

NUMBER	DAMAGE
1	BURN
2	BURN
3	BURN
4	BURN
5	BURN
6	BURN
7	BURN
8	BURN
9	BURN
10	BURN
11	BURN
12	BURN
13	BURN
14	BURN
15	WIND
16	WIND
17	WIND
18	WIND
19	WIND
20	WIND
21	WIND
22	WIND
23	WIND
24	WIND
25	WIND
26	BURN
27	BURN
28	BURN
29	BURN
30	BURN
31	BURN
32	BURN
33	BURN
34	BURN
35	BURN
36	BURN
37	BURN
38	BURN
39	WIND
40	WIND
41	WIND
42	WIND
43	WIND
44	WIND
45	BURN
46	BURN
47	BURN
48	WIND
49	WIND
50	WIND
51	WIND
52	WIND
53	WIND

5 choices

3
30
34
39
49

Also Maybe #12

Warren Gorden
NYC DEP

GSE™
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 713-875-6010

May 9, 1996

Breco Mechanical Group, Inc.
201 Saw Mill River Road
Yonkers, New York 10701

Attn: Mark SanAngelo

Re: Pelham Bay Landfill
GSE Project No. XA4790
May 7, 1996 Meeting Minutes

Dear Mark,

Please find the following minutes from our meeting on May 7, 1996, at the above referenced project. I have summarized my understanding of the agreements that were made between GSE, Breco, Woodward-Clyde, and the NYCDEP.

Please distribute the minutes to the listed parties, have them sign, if they agree with the following statements, and return the signed copy to my attention. If a signed copy is not returned by Monday, May 13, 1996, GSE Lining will stop work and demobe the project until this matter is resolved.

If you have any questions, do not hesitate to contact me at 713-230-5823.

Sincerely,

Ronald Zunker, Jr.
Project Manager
Installation Services

enclosure

MEMORANDUM

TO: Meeting Attendees

FROM: Ron Zunker, Project Manager
GSE Lining Technology, Inc.

DATE: May 9, 1996

SUBJECT: Minutes of Meeting
Held May 7, 1996
Pelham Bay Landfill
Bronx, New York

The purpose of these minutes is to document pertinent discussions and agreements made at this meeting. Should anyone attending this meeting take exception to any portion of these minutes, they should notify Ron Zunker immediately upon receipt. If no exceptions are noted, please sign and return this page via fax to 713-230-2528.

Name	Organization	Signature
Mark SanAngelo	Breco Mechanical Group, Inc.	
Said Mokbel	Woodward-Clyde Consultants	
Warren Gordon	NYCDEP	Warren Gordon
Bill Walling	GSE Lining Technology, Inc.	
Ron Zunker	GSE Lining Technology, Inc.	

It is GSE Lining Technology, Inc.'s understanding that the following points were agreed upon during the meeting held on May 7, 1996 at the Pelham Bay Landfill site.

1. GSE Lining Technology, Inc. will provide written certification that GSE visually surveyed the damage on the Pelham Bay Landfill, visually inspected the location of the test samples, will test the samples as specified in item #2 and will warranty the material and installation per the contract.

2. GSE Lining Technology, Inc. will test all samples (53) for tensile (in the machine and cross direction) and thickness. Fifteen (15) samples will require additional testing. The additional tests are low temperature brittleness, OIT, tear, puncture, dimensional stability and specific gravity.

3. GSE Lining Technology, Inc. will choose ten of the fifteen samples to be tested according to item #2. Woodward-Clyde and NYCDEP will choose the remaining five samples. Testing will start immediately and be completed within three weeks.

4. GSE Lining Technology, Inc. will provide written test results to Breco.

5. GSE Lining Technology, Inc. will provide written certification for ESCR results, referenced by panel numbers.

6. GSE Lining Technology, Inc. will provide an As-built with location of test samples identified, once installation is completed.

7. Liner along the anchor trench will be visually inspected for any signs of stress. Liner quality will be verified by destructive sampling of the tie-in seam. & Micrometer.

8. Breco will survey the location of the test samples. Breco will also survey the site in order to verify quantity of damaged material. Breco will pay for this survey.

rpz/page 3

NYC DEP

FIELD MEMO

TO: Warren Gordon, P.E.
Resident Engineer, Pelham Bay Landfill

FROM: Daniel Creighton
Geomembrane Supervisor

DATE: March 14, 1996

SUBJECT: Geomembrane Damage to the Top of Landfill

Due to the recent damage to the top of the landfill, much repair work and replacement of the geomembrane must be done. The following is a summary of the work which must be completed.

Replacement of missing panels:

Panels Totally Blown Away:

700, 701, 702, 703, 704, 705, 706, 731, 732, S-18, S19,
S-20, S-21, S-22, S-23, S-24, S-25, S-26, S-27, S-28, S-29, S-30,
S-31, S-32, S-33, S-56, S-57, S-58, S-59, S-60, S-61, S-62, S-63,
S-64, S-65, S-66, S-67, S-68, S-69, S-70, S-71, S-101, S-102, S-103,
S-104, S-105, S-106, S-107, S-108, S-109, S-110, S-111, S-117, S-118, S-119,
S-120, S-121, S-122, S-123, S-124, S-125, S-126, S-127, S-128, S-139, S-140,
S-141, S-142, S-143, S-144, S-145, S-146, S-147, S-148, S-149, S-150, S-195,
S-197, S-200 and S-203.

Total SF = 190,752

Panels Partially Blown Away:

Eastern Half of Panel S-112, Eastern Half of Panel S-113,
Eastern One Quarter of Panel S-114, Northern Half of Panel S-151,
Eastern Half of Panel S-198, Eastern Half of Panel S-202,
Eastern Half of Panel S-204, Eastern Three Quarters of Panel S-206,
Eastern Half of Panel S-208, Eastern Half of Panel S-209 and
Eastern Half of Panel S-210.

Total SF = 18,667

Sub-Total of Panels Blown Away = 209,419 SF

Replacement of panels damaged beyond repair:

Panels Totally Damaged:

699, 733, 734, 735, 736, 737, S-11, S-12, S-13, S-14, S-15
S-16, S-17, S-34, S-35, S-55, S-80, S-84, S-85, S-95, S-96, S-97,
S-98, S-99, S-100, S-115, S-129, S-152, S-192.

Total SF = 72,975

(continued on next page)

Panels Partially Damaged:

Eastern portion of 692, Eastern portion of 693,
Eastern portion of 694, Eastern portion of 695,
Eastern portion of 696, Eastern Half of Panel 776,
Eastern Half of Panel 777, Eastern Half of Panel 778,
Eastern Half of Panel 779, Eastern Half of Panel 204,
Western Half of Panel S-36, Western Half of Panel S-37,
Western Half of Panel S-38, Western Half of Panel S-78,
Western Half of Panel S-79, Western Portion of Panel S-81,
Northwestern Three Quarters of Panel S-83,
Western Half of Panel S-82, Western Half of Panel S-86,
Western Half of Panel S-87, Western Half of Panel S-88,
Western Half of Panel S-112, Western Half of Panel S-113,
Western Three Quarters of Panel S-114,
Southern Half of Panel S-151, Eastern Half of Panel S-193,
Eastern Half of Panel S-194, Eastern Half of Panel S-196,
Middle of Panel S-198, Middle of Panel S-199,
Western Half of Panel S-202, Middle of Panel S-204,
Middle of Panel S-206, Middle of Panel S-208,
Middle of Panel S-209 and Middle of Panel S-210.

Total SF = 51,442

Sub-Total of Panels Damaged Beyond Repair = 124,417 SF

Panels of questionable integrity to be checked:

S-36, S-37, S-38, S-39, S-40, S-41, S-42, S-43, S-44, S-45, S-46, S-47, S-48, S-49, S-50, S-51, S-52, S-53, S-54, S-74, S-75, S-76, S-77, S-92, S-93, S-93A, S-94, S-153, S-154, S-155, S-156, S-160, S-161, S-185, S-186, S-189, S-190 and S-211.

Sub-Total of Panels of Questionable Integrity = 83,739 SF

Grand Total of Damaged and Questionable Panels = 417,575 SF

All other panels on top of landfill visually appear to be salvageable. However, tests along the borders of damaged and questionable panels must be tested frequently to insure the integrity of the material. Tests should include all appropriate methods as per the Contract Documents to insure that the material still meets the specifications listed on page 02778-5, Part 2, Section 2.2.A. In addition, geomembrane should be free of holes or blisters and be of the same quality as when delivered to site. BRECO should submit their expert's proposal to repair the top of the landfill in accordance with the Specifications and Contract Documents at their earliest convenience.

xc: Ramaglia/Durig
Ciancia (WCCI)
NYS DEC
Rant (BRECO)

FIELD MEMO

TO: Warren Gordon, P.E.
Resident Engineer, Pelham Bay Landfill

FROM: Daniel Creighton
Geomembrane Supervisor

DATE: March 19, 1996

SUBJECT: Addendum: Geomembrane Damage to the Top of Landfill (3/14/96)

Due to the thunderstorm and winds last night, much more geomembrane liner was blown away and damaged beyond repair. The following is a summary of the additional panels that were damaged and must be replaced.

Panels Totally Blown Away:

733, 734, 735, 736, 737, S-3, S-4, S-5, S-6, S-7, S-8,
S-9, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-39, S-40, S-41,
S-42, S-43, S-44, S-45, S-46, S-47, S-48, S-49, S-50, S-51, S-52,
S-53, S-54, S-55, S-92, S-93, S-93A, S-94, S-95, S-96, S-97, S-98,
S-99, S-100, S-112, S-113, and S-114.

Sub-Total SF = 122,657

New Total of Panels Blown Away = 324,563 SF
New Total of Panels Damaged Beyond Repair = 65,516 SF
New Approximate Total of Questionable Panels = 42,428 SF

Amended Grand Total of Damaged and Questionable Panels = 432,507 SF

A few other panels on top of landfill are now questionable and tests along the borders of damaged panels will have to be done more frequently to insure the integrity of the material. Again, tests should include all appropriate methods as per the Contract Documents to insure that the material still meets the specifications listed on page 02778-5, Part 2, Section 2.2.A.

xc: Ramaglia/Durig
Ciancia (WCCI)
NYS DEC
Rant (BRECO)

BRECO MECHANICAL GROUP, INC.
201 SAW MILL RIVER ROAD
YONKERS, NEW YORK 10701

*TEL. (914) 963-3600 * FAX (914) 963-3989*

June 17, 1996

Mr. Roy Durig, P.E.
Chief - Landfill Remediation
New York City Department of
Environmental Protection
96-05 Horace Harding Expressway
5th Floor - Lefrak Plaza
Corona, New York 11368

Re: Pelham Bay Landfill Closure
Contract No. 876-HP
Letter No. 78

Dear Mr. Durig,

The attached letter from GSE Lining Technology Inc. dated June 14, 1996 was forwarded directly to you by GSE. GSE's letter essentially states that GSE has again completed the installation of the geomembrane liner. Per the provisions of Paragraph 3.3K of Specification 02778, GEOMEMBRANE ACCEPTANCE, the geomembrane installation has been accepted by the DEP. Per paragraph 3.3K, ownership and responsibility for the geomembrane now belongs to NYCDEP, (and not to Breco, as erroneously stated in GSE's 6/14/96 letter).

Consistent with this, GSE states that any damage that occurs to the geomembrane from and after June 14, 1996 will be repaired by GSE at and for the account of the NYCDEP.

We will be completing the final tabulation of costs for the repair and will submit them to you shortly.

Very Truly Yours,
BRECO MECHANICAL GROUP, INC.

Mark SanAngelo
Project Manager

Enc.

cc: P. Zoltanesky, Jr
P. Smith/ J. Jarahari
W. Gordon
A. Ciancia
S. Mokbel
Durig.617

GSE™
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 713-875-6010

June 14, 1996

Mark San Angelo
Breco Mechanical Group, Inc.
201 Saw Mill River Road
Yonkers, New York 10701

RE: Pelham Bay Landfill, Cover and Protection of Work
GSE Lining Technology, Inc. Project Number XA4790

Dear Mr. San Angelo:

On June 14, 1996, GSE Lining Technology, Inc. completed its installation subcontract requirements on the above referenced project, including the repairs to the damaged liner. As of this date, the Scope of Work required of GSE has final acceptance by DEP's third party inspector (four (4) final acceptance sheets attached) and you as the onsite representative of Breco Mechanical Group, Inc. With these acceptances, except for the submittal of as-built panel drawings; final submittals of conformance testing; and final billing, GSE has completed the installation of the geomembrane and the responsibility for protection of the geomembrane now belongs to Breco.

Please be advised that the exposed liner is now at risk to the elements, Acts of God and the onsite construction activities of Breco Mechanical Group, Inc. and its other subcontractors, invitees, and other third parties. Any damage that occurs to the geomembrane from and after June 14, 1996 will be repaired by GSE at and for the account of Breco Mechanical Group, Inc. GSE, in the very near future, will be submitting the remaining contract items for approval by the onsite Resident Engineer and the onsite representative of Breco Mechanical Group, Inc.

Sincerely,

Ronald Zunker, Jr.
Project Manager -
Installation Services

RZ/cr

cc: Warren Gordon, NYCDEP
Master File

Gundle

PROJECT: Pelham Bay Landfill
LOCATION: Bronx New York
DATE 5-24-96 P.F.# XA4790

Final
~~PRE-START~~ SITE INSPECTION

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vic Siracusa	GSE Liner Technology	Field Supvr.
Paul Doscher	Breco Mechanical Group, Inc.	
Daniel Crotanon	NYC DEP	Geo Supvr.

2. DESCRIPTION OF INSPECTED AREA Areas Wall Final Inspection.
60mil HDPE Smooth Liner From Panel PR.1 PR.2 PR.3 PR.4 PR.5 PR.6 PR.7 PR.8 PR.9 PR.10 PR.11 PR.12 PR.13 PR14 PR.15 PR.16 PR.17 PR.18

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE: _____

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

GUNDLE REPRESENTATIVE	OWNER/CONTRACTOR	INSPECTOR
(WHITE)	(YELLOW)	(PINK)

Form No. 05125
PROUDLY PRINTED IN TEXAS BY SOUTHWEST DATACORP (713) 465-4900 GUNDLE REPRESENTATIVE

printed on recycled paper

Gundle®

PROJECT: Pelham Bay L.F
LOCATION: Bronx New York
DATE 5/28/96 P.F.# XA4790

Final
~~PRE-START SITE~~ INSPECTION

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vik Siaekasonte	G.S.E Lining Technology	Field sup
Paul Poraker	Breco Mechanical Group Inc	
Daniel	NYC DEP	

2. DESCRIPTION OF INSPECTED AREA

Final inspection Panel PR.19 TO PR.31

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE:

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

[signature] GUNDLE REPRESENTATIVE (WHITE)

[signature] OWNER/CONTRACTOR (YELLOW)

[signature] INSPECTOR (PINK)

Form No. 05186

printed on recycled paper

Gundle

PROJECT: Pelham Pkwy LIE
LOCATION: BRONX NEW YORK
DATE 5.31 P.F.# KA4780

~~PRE-START SITE INSPECTION~~ Final

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
VIC SIACCASONE	G.S.E	SUP
PAUL DOSCHER	BRECO	SUP
DANIEL	DEP	SUP

2. DESCRIPTION OF INSPECTED AREA

Final INSPECTION PANELS Room PR.51 TO PR-66 PR-67 TO PR80

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE:

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

6-2-96

GUNDLE REPRESENTATIVE (WHITE) | OWNER/CONTRACTOR (YELLOW) | INSPECTOR (PINK)

Gundle

PROJECT: Pelham Bay
LOCATION: Bronx NY
DATE 6/11/96 P.F.# XA4790

Final
~~PRE-START SITE INSPECTION~~

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vik Siackason e.	G.S.E.	Sup
Paul Dascher	Breco	Sup
Daniel -	Dep	Sup

2. DESCRIPTION OF INSPECTED AREA
Final inspection panels From TR1 thru TR11 and PR81 thru PR124

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:
Supply GSE TEE Shots (N)

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE: _____

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

GUNDLE REPRESENTATIVE (WHITE) | OWNER/CONTRACTOR (YELLOW) | INSPECTOR (PINK)

Gundle Lining Construction Corp
Gundle
19103 Gundle Road
Houston, Texas 77073-3598
U.S.A.
Phone: (713) 443-8564
Toll Free: (800) 435-2008
Telex: 764057 GUNDLE HOU
FAX: (713) 875-6010

CERTIFICATE OF ACCEPTANCE

JOB NO: XA 4790
JOB NAME: Pelham Bay Landfill
CLIENT: BEECO MECHANICAL CRC
BILL TO: SAME

JOB DESCR:
% COMPLETE OF TOTAL JOB: 100%

MATERIAL	ESTIMATED SQ. FEET	FINAL QUANTITY / DESCRIPTION
60mil HDPE	315524	DEPLOYED WELD + QC.
60mil HOT	23.078	DEPLOYED WELD AND QC.

I, the undersigned, duly authorized representative of _____ do hereby take over and accept the work described above from the date hereof and confirm that to the best of my knowledge the work has been completed in accordance with specifications and the terms and conditions of the contract.

Name	Signature	Title	Date
V.K. Blackmore	V.K. Blackmore	Field supervisor	6-13-96

Certificate accepted by Gundle Lining Representative

Name	Signature	Title	Date
PAUL F. DOSCHER	Paul F. Doscher	SUPER.	6-13-96

New York City Department of Environmental Protection

Division of Landfill Remediation

Pelham Bay Landfill

Contract 876-HP

Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/1/96	1	S-211	178	153	
			176	160	
	2	S-210	169	170	
			170	173	
	3	S-208	169	164	LINER HAS SLIGHT MELT MARKS ON UNDERSIDE
			166	163	
	4	S-204	172	185	
			166	189	
	5	S-198	160	174	
			165	171	
	6	S-194	172	169	
			172	162	
	7	S-190	169	175	
			163	182	
	8	S-187	178	177	MISSING COMPOSITE FOR ½ OF AREA.
			172	175	
	9	S-160	172	170	
			174	162	
	10	S-159	163	170	
			162	170	
	11	S-185	159	169	
			160	166	
	12	S-189	166	182	NO COMPOSITE
			160	176	
	13	S-193	172	185	NO COMPOSITE
			173	175	

Inspector's Name

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/1/96	14	S-195	171	168	No Composite
			177	164	
5/2/96	15	S-152 EAST	156	161	½ No Composite. Slight evidence of melting on Southern edge
			162	161	
	16	S-152 CENTER	164	174	
			171	169	
	17	S-129 EAST	170	175	
			168	178	
	18	S-129 CENTER	159	167	
			165	170	
	19	S-129 WEST	167	174	No Composite
			168	173	
	20	S-131	171	163	
			173	168	
	21	S-72	166	168	
			167	175	
	22	S-71	158	171	
			158	168	
	23	S-71	160	172	~~No Composite~~
			176	160	
	24	S-71	160	167	No Composite
			160	172	
	25	S-32	163	177	No Composite
			162	175	
	26	S-33	158	174	
			158	171	

Inspector's Name Daniel O'Connor

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/2/96	27	S-35	178	183	
			179	182	
	28	S-37	167	174	
			168	178	
	29	S-78	158	179	
			161	177	
	30	S-84	149	164	
			153	170	
	31	S-82	158	167	FOLDED OVER COMPOSITE NE CORNER
			164	167	
	32	S-87	155	164	
			157	166	
	33 T	779	179	192	
			178	190	
	34 T	777	172	171	½ COMPOSITE SUNKILLED W. SLIGHT MELT MARKS ON UNDERSIDE
			173	170	
	35 T	686	168	171	
			165	169	
	36 T	688	161	170	
			162	167	
	37 T	691	169	174	
			167	168	
	38 T	683	167	175	
			169	173	
	39 T	695	172	169	
			171	169	

T = TEXTURED

Inspector's Name Daniel O'Connor

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/2/96	40 T	P-699 TOP	206	200	
			200	197	
	41 T	P-699 BOTTOM	198	199	
			199	204	
	42 T	P-702	197	197	
			190	186	
	43 T	P-733 BOTTOM	209	209	
			203	201	
	44 T	P-733 TOP	200	200	
			199	195	
	45 T	P-735	193 D.C	199	BUNDLED COMPOSITE - GAS WELL
			~~193~~ 194 D.C	198	
	46 T	P-737	195	203	
			190	205	
	47 S	S-11 BOTTOM	186	193	
			187	177	
	48 S	S-11 MIDDLE	181	171	
			183	175	
	49 S	S-11 TOP	188	201	
			191	204	
	50 S	S-2	199	212	
			200	210	
	51 S	S-4	183	200	
			192	194	
	52 S	S-6	194	204	
			191	193	
	53 S	S-9	175 / 175	196 / 191	Inspector's Name: Daniel O'Connor

T = Textured
S = smooth

C:\123R4W\SAMPLE\DAM_SAMP

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:	DATE WELDED:	PAGE OF
JOB# XA4790	JOB NAME: Pelham Bay Ln F	
SUPERVISOR NAME: Bill Shaughnessy	S.S.#	AMBIENT TEMP.

JOB SPECIFICATION REQUIREMENTS:	MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:
	MATERIAL	MIL Same direction	PEEL IN: Against	PEEL OUT:	SHEAR:

PUS/ EXT	MAT./MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
	60 mil HSPE	S-11	SAM-47			186	P	183	P				
						187	P	177	P				
		S-11	SAM-48			181	P	171	P		1		
						183	P	175	P				
		S-11	SAM-49			188	P	201	P				
						191	P	204	P				
		S-02	SAM-50			199	P	212	P				
						200	P	210	P				
		S-4	SAM-51			183	P	200	P				
						182	P	193	P				
		S-6	SAM-52			194	P	191	P				
						204	P	193	P				
		S-9	SAM-53			175	P	196	P				
						175	P	191	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE

ATTN: Nan ep, x747

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:		DATE WELDED:		PAGE OF
JOB#	JOB NAME:			
SUPERVISOR NAME:		S.S.#		AMBIENT TEMP.
JOB SPEC. REQUIREMENTS:	MATERIAL	MIL	PEEL SPEC:	SHEAR SPEC:
	MATERIAL	MIL 5.	PEEL SPEC: A.	SHEAR SPEC:

FUS/ EXT	MAT./MIL	PANEL ~~SEAM~~ #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
		S-152	SAMPLE #15			156.	P.	161	P.				
						162.	P	161	P				
		S-152	SAMPLE #16			164	P	174	P				
						171	P	169	P				
		S-129	SAMPLE-17			170	P	175	P				
						168	P	178	P.				
		S-129	SAMPLE-18			159	P	167	P				
						164	P	170	P				
		S-129	SAMPLE-19			167	P	174	P				
						168.	P	175	P				
		S-131	SAMPLE-20			171	P	163	P				
						173	P	168	P				
		S-72	SAMPLE-21			166	P	168	P				
						167	P	175	P				

All weld test field reports must be faxed in or phoned in daily. PHONE (800) 435-2008; FAX (713) 875-6010

CALL ED ZIMMEL (x821) OR YOUR PROJECT MANAGER UPON NOTIFICATION OF A FAILURE!!!

Rev. 11-2-94

FIELD REPORT – WE.. TESTS

DATE FAXED OR CALLED IN:	DATE WELDED:	PAGE OF
JOB# XA4790 JOB NAME: Pelham Bay Bronx NY		
SUPERVISOR NAME: T.K. Stackhouse	S.S.# 464 49 6623	AMBIENT TEMP:

JOB SPECIFICATION REQUIREMENTS: MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:
MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:

FUS/ EXT	MAT./MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
			8			178	–	177	P				
						172	–	175	P				
			9			172	–	170	P		1		
						174	–	162	P				
			10			163	–	170	P				
						162	–	170	P				
			11			159	–	169	P				
						166	–	166	P				
			12			166	–	182	P				
						160	–	176	P				
			13			172	–	185	P				
						173	–	175	P				
			14			171	–	168	P				
						177	–	164	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE!!

REV.3/24/93

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:

DATE WELDED: 5-1-96

PAGE OF

JOB# 19479 JOB NAME: Pelham Bay Bronx NY

SUPERVISOR NAME: F.K. Stackasone

S.S.# 464-49-6673

AMBIENT TEMP:

JOB SPECIFICATION REQUIREMENTS: MATERIAL MIL Same direction PEEL IN: opcite PEEL OUT: SHEAR:

MATERIAL MIL Yield PEEL IN: Break PEEL OUT: SHEAR:

FUS/ EXT	MAT./MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	~~PEEL IN~~ ~~PPI~~	~~PEEL OUT~~ ~~PPI~~	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
			1			178	–	153	P				
						176	–	160	P				
			2			169	–	170	P		1		
						170	–	173	P				
			3			169	–	164	P				
						168	–	163	P				
			4			172	–	185	P				
						166	–	189	P				
			5			160	–	174	P				
						165	–	171	P				
			6			172	–	169	P				
						172	–	162	P				
			7			169	–	175	P				
						163	–	182	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE!!

REV. 3/24/93

BRECO MECHANICAL GROUP, INC.
201 Saw Mill River Road
YONKERS, NEW YORK 10701

(914) 963-3850
(914) 963-3600

LETTER OF TRANSMITTAL

DATE	JOB NO.
5/20/96	876HP
ATTENTION	
RE:	

TO WARREN GORDON, P.E.
NYC-DEP

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ QC TEST RESULTS

COPIES	DATE	NO.	DESCRIPTION
1		6	RESULTS OF TESTS PERFORMED ON SAMPLES TAKEN ON TOP DUE TO DAMAGE.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO FILE

SIGNED: Michael Rand

If enclosures are not as noted, kindly notify us at once.

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
1	Pass	5/8/96	S	143	165	19	19	256	295	729	809	54	52
2	Pass	5/8/96	S	168	166	18	15	305	287	777	793		
3	Pass	5/8/96	S	153	148	20	16	277	255	794	793	49	54
4	Pass	5/8/96	S	171	164	17	16	291	280	743	769		
5	Pass	5/8/96	S	146	160	18	17	249	303	704	853		
6	Pass	5/8/96	S	168	166	21	18	258	262	675	759	52	61
7	Pass	5/8/96	S	163	160	19	17	264	244	685	720	49	55
8	Pass	5/8/96	S	162	161	21	16	314	309	806	853		
9	Pass	5/8/96	S	153	148	18	16	317	287	835	816		
10	Pass	5/8/96	T	155	169	20	16	276	300	772	830		
11	Pass	5/8/96	S	151	151	18	17	311	284	837	828		
12	Pass	5/8/96	S	157	168	18	18	298	298	791	817		
13	Pass	5/8/96	S	169	162	20	16	289	264	756	760		
14	Pass	5/8/96	S	166	166	18	18	298	254	764	709		
15	Pass	5/8/96	S	162	163	19	15	294	270	782	792	52	58
16	Pass	5/8/96	S	154	176	18	18	270	302	738	804		
17	Pass	5/8/96	S	160	171	20	16	315	282	887	812		
18	Pass	5/8/96	S	155	171	17	18	285	314	798	863		
19	Pass	5/8/96	S	158	178	18	17	303	324	827	897	52	56

Report By:
Melody Adams
Nathan Ivy

GSE I ing Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
20	Pass	5/8/96	S	152	157	19	16	276	293	768	857		
21	Pass	5/8/96	S	149	178	20	17	278	288	809	794		
22	Pass	5/8/96	S	158	176	17	17	304	337	821	903		
23	Pass	5/8/96	S	175	169	19	17	312	289	767	809	53	56
24	Pass	5/8/96	S	155	168	17	17	255	320	689	856		
25	Pass	5/8/96	S	156	158	20	16	275	284	728	804		
26	Pass	5/8/96	S	155	165	20	17	285	342	766	914	53	58
27	Pass	5/8/96	S	169	178	17	17	255	296	744	818		
28	Pass	5/8/96	S	163	177	17	17	253	268	705	760		
29	Pass	5/8/96	S	195	172	15	16	293	313	753	824		
30	Pass	5/8/96	S	178	155	16	17	290	292	794	798	53	53
31	Pass	5/8/96	S	181	161	17	17	267	271	746	765		
32	Pass	5/8/96	S	180	167	14	16	281	310	768	805		
33	Pass	5/8/96	T	180	182	16	17	193	209	541	604	49	50
34	Pass	5/8/96	T	178	182	17	16	155	154	416	461	55	52
35	Pass	5/8/96	T	168	172	16	16	180	181	504	519		
36	Pass	5/8/96	T	166	172	17	17	185	177	516	511	52	47
37	Pass	5/8/96	T	164	164	16	16	120	112	393	318		
38	Pass	5/8/96	T	182	175	16	17	182	207	489	553		

Report By:
Melody Adams

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield (ASTM D 638, Type IV, 2 ipm) Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield CD [%]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance CD [lb.]
39	Pass	5/8/96	T	160	164	17	17	102	157	416	501	55	51
40	Pass	5/8/96	T	170	179	17	16	194	113	576	440		
41	Pass	5/8/96	T	174	178	16	15	132	142	220	449		
42	Pass	5/8/96	T	164	175	17	16	202	128	560	418		
43	Pass	5/8/96	T	172	165	17	16	193	124	564	529		
44	Pass	5/8/96	T	169	179	17	14	164	178	475	544		
45	Pass	5/8/96	T	171	175	17	16	175	130	483	269	54	49
46	Pass	5/8/96	T	173	170	18	16	166	171	516	480		
47	Pass	5/8/96	S	191	161	15	16	296	282	779	786		
48	Pass	5/8/96	S	155	161	16	15	240	265	703	790		
49	Pass	5/8/96	S	170	185	16	14	280	292	734	770	54	52
50	Pass	5/8/96	S	175	187	16	14	290	303	765	810		
51	Pass	5/8/96	S	167	173	16	14	285	289	774	803		
52	Pass	5/8/96	S	173	168	17	15	272	277	730	798		
53	Pass	5/8/96	S	156	160	17	17	242	257	705	761		

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
1	Pass	5/8/96	S	92	-0.17	-0.15	0.95	150	<-40	59
2	Pass	5/8/96	S							62
3	Pass	5/8/96	S	92	0.1	0.08	0.95	150	<-40	58
4	Pass	5/8/96	S							61
5	Pass	5/8/96	S							59
6	Pass	5/8/96	S	104	0.15	0.25	0.95	150	<-40	61
7	Pass	5/8/96	S	102	-0.07	-0.15	0.95	150	<-40	61
8	Pass	5/8/96	S							60
9	Pass	5/8/96	S							60
10	Pass	5/8/96	T							60
11	Pass	5/8/96	S							59
12	Pass	5/8/96	S							59
13	Pass	5/8/96	S							61
14	Pass	5/8/96	S							62
15	Pass	5/8/96	S	101	-0.08	0.07	0.95	150	<-40	60
16	Pass	5/8/96	S							62
17	Pass	5/8/96	S							60
18	Pass	5/8/96	S							61
19	Pass	5/8/96	S	89	-0.15	-0.37	0.95	150	<-40	61

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
20	Pass	5/8/96	S							60
21	Pass	5/8/96	S							60
22	Pass	5/8/96	S							61
23	Pass	5/8/96	S	97	-0.23	-0.1	0.95	150	<-40	62
24	Pass	5/8/96	S							60
25	Pass	5/8/96	S							60
26	Pass	5/8/96	S	106	0.17	-0.35	0.95	150	<-40	62
27	Pass	5/8/96	S							62
28	Pass	5/8/96	S							60
29	Pass	5/8/96	S							63
30	Pass	5/8/96	S	102	0.42	0.12	0.95	Pending	Pending	61
31	Pass	5/8/96	S							61
32	Pass	5/8/96	S							62
33	Pass	5/8/96	T	111	0.25	0.02	0.95	112	Pending	63
34	Pass	5/8/96	T	101	0.12	0.1	0.95			63
35	Pass	5/8/96	T							62
36	Pass	5/8/96	T	96	0.12	0.05	0.95	174	Pending	61
37	Pass	5/8/96	T							64
38	Pass	5/8/96	T							65

Report By:
Melody Adams
Nathan Ivy

GSE Lin g Technology, Inc.

Report Date: 5/17/96

Pelham Bay Lanafill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
39	Pass	5/8/96	T	97	0.02	0.2	0.95	Pending	Pending	63
40	Pass	5/8/96	T							62
41	Pass	5/8/96	T							61
42	Pass	5/8/96	T							63
43	Pass	5/8/96	T							64
44	Pass	5/8/96	T							62
45	Pass	5/8/96	T	101	-0.13	0.2	0.95	Pending	Pending	63
46	Pass	5/8/96	T							63
47	Pass	5/8/96	S							59
48	Pass	5/8/96	S							56
49	Pass	5/8/96	S	95	-0.18	0.33	0.95	Pending	Pending	66
50	Pass	5/8/96	S							60
51	Pass	5/8/96	S							58
52	Pass	5/8/96	S							60
53	Pass	5/8/96	S							60

Report By:

GSE™

Quality Control Certificate

RAILCAR : ACFX53288
MATERIAL : HDT 060 MIL
BATCH # : 050595
ROLL # : 03032371

MANF. DATE : 05/05/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	57.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.947	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	154	
Break Strength (ppi)	EVERY ROLL	75	192	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	589	
Puncture Resistance (lb)	EVERY ROLL	80	122	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	61	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	-0.28	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
#20
6/3/96
QA

GSE™

Quality Control Certificate

RAILCAR : TR9316-2
MATERIAL : HDT 060 MIL
BATCH # : 012295
ROLL # : 04019914

MANF. DATE : 01/22/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	56.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.1	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.946	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	174	
Break Strength (ppi)	EVERY ROLL	75	155	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	490	
Puncture Resistance (lb)	EVERY ROLL	80	120	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	55	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	0.05	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
DP
#20
6/3/96
QA

GSE™

Quality Control Certificate

RAILCAR : PSPX1109
MATERIAL : HDT 060 MIL
BATCH # : 082195
ROLL # : 03034514

MANF. DATE : 08/21/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	56.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.947	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	157	
Break Strength (ppi)	EVERY ROLL	75	157	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	408	
Puncture Resistance (lb)	EVERY ROLL	80	112	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	57	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	0.02	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
#20
6/3/96
QA

C-1 Geocomposite Production Minimum Property Values Quality Control Certificates

Appendix C-1
GEOCOMPOSITE PRODUCTION MINIMUM PROPERTY VALUES QUALITY CONTROL CERTIFICATES

The Tensar Corporation supplied the geocomposite (Tensar product code DC4205)for the Pelham Bay Landfill Closure. Geocomposite for this project was delivered to the project site from April 1995 through May 1996. Each shipment of geocomposite material was accompanied by quality control certification from the manufacturer. Each certificate provide information on the thickness, tensile strength, melt index, density, %CB and Peel and/or Bond Strength. The range of values for each parameter were as follows:

Thickness (mm)	5.20 – 5.98
Tensile Strength (lb/ft)	588.6 – 904.8
Melt Index (gm/10min)	0.318 – 0.669
Density (gm/cc)	0.948 – 0.978
% CB	2.16 – 2.92

Peel Strength Addendum (gm/in)

Top	1104 - 5148
Bottom	1052 - 4791

Bond Strength (g/in) 1129 - 4640

In addition to the QC certification for the particular lot of material shipped, Material Property Data Sheets were provided. Copies of representative QC documentation that accompanied each shipment are included in this appendix.

Tensar®

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
(404) 968-3255

MAY 04, 1995

AGAM CONSTRUCTORS, INC.
CONSTRUCTION MANAGERS
RECEIVED
MAY 05 1995
PRESIDENT
ARMANDO M. BYRNE S.

AGAM CONSTRUCTORS INC
4E DOWNING PLACE
POUGHKEEPSIE, NY 12603

REFERENCE: TENSAR ORDER NUMBER: 400895
PURCHASE ORDER NUMBER: 135-03/94-144
BILL OF LADING NUMBER: 53705

SOLD TO: AGAM CONSTRUCTORS INC
4E DOWNING PLACE

POUGHKEEPSIE, NY 12603

SHIP TO: AGAM FIELD OFFICE
PELHAM BAY LANDFILL
3599 BRUCKNER BLVD.

BRONX, NY 10464

This is to certify that TENSAR DC420501 geocomposite as manufactured by the TENSAR Corporation, meets the characteristics and properties per the attached specification sheet.

Sincerely,

Ron Humpolick
Manager of Continuous Improvement
and Quality Control

Bill Wright
Notary Public, Clayton County, Georgia
My Commission Expires May 10, 1998

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
(404) 968-3255

AGAM CONSTRUCTORS INC

PELHAM BAY LANDFILL

DC 4205 018 PEEL STRENGTH ADDENDUM

(gm/in)

LOT NO.	TOP	BOTTOM
5-0240-07A	2782	2486
5-0241-05A	3091	2514
5-0241-17B	2439	2348
5-0241-37B	2963	1911
5-0241-42A	2421	3599
5-0241-47A	3463	2259
5-0241-51A	3424	1895
5-0241-57A	2111	3372
5-0241-61A	2241	3436
5-0241-26A	4168	4696
5-0241-14A	2499	2196
5-0241-09B	2143	2163

DRAINAGE COMPOSITE DC4205

The drainage composite shall consist of a geotextile bonded to each side of a drainage net. The drainage composite shall have a low compressibility in order to maintain high flow capacity over a wide range of confining pressures. The bonding process shall not introduce adhesives or other foreign products. The strength of the bond between the drainage net and the geotextile shall be greater than the friction developed between the geotextile and a soil. The drainage composite shall maintain a high flow under long term loading conditions and shall be resistant to all forms of biological or chemical degradation normally encountered in a soil environment. The drainage composite shall be made from the drainage net and geotextile products whose property requirements are listed below.

PROPERTY	TEST METHOD	NOTES	UNITS	VALUE
Flow Capacity	ASTM 4716	1		
• Gradient of 1				
• Transmissivity @ 500 psf			$x10^{-3}ft^2/sec$	21
			(gpm/ft width)	(9.55)
• Transmissivity @ 10,000 psf			$x10^{-3}ft^2/sec$	16
			(gpm/ft width)	(7.24)
• Transmissivity @ 20,000 psf			$x10^{-3}ft^2/sec$	8.6
			(gpm/ft width)	(3.86)
Mechanical Properties		3,4,5		
• Compression		1,2		
@ 20,000 psf			%	50
• Peak Tensile Strength-MD	ASTM D5035	6	lbs/ft	575
Drainage Net				
• Aperture Size	I.D. Calipered	7	inches	0.3
• Thickness	O.D. Calipered	8,9	inches	0.20
• Polyethylene Polymer				
-Specific Gravity	ASTM D792		g/cm^3	0.940
-Carbon Black Stabilization	ASTM D4218		%	2.5
Geotextile		10		
• Grab Tensile Strength	ASTM D4632		lbs	130/110
• AOS	ASTM D4751		US Std.Sv.Sz.	70
• Weight	ASTM D1910		oz/sy	4.0,4.5,6.0,8.0,10
Composite				
• Laminate Bond Strength	ASTM F904	11	g/in	400
• Dimensions - Finished Product				
-Thickness	O.D. Calipered		in	0.24
-Roll Length			ft	225
-Roll Width (Drainage Net)			ft	14
• Roll Weight			lbs	890

Notes

1. Test values are for the core net only.
2. Compression Tests are performed on a 2-inch square sample loaded at a 1mm/minute constant rate of strain.
3. Test values are for drainage net prior to bonding process.
4. All test values are nominal, unless otherwise indicated.
5. MD - Machine (roll) Direction.
6. Minimum value.
7. Inside dimensions in each principal direction are measured by calipers.
8. Outside dimensions in each principal direction are measured by calipers.
9. Thickness is measured by placing the specimen flat on a comparator base and lowering a round 1/2 inch diameter flat end contact surface squarely over a junction.
10. Geotextile splices within each roll of finished goods shall be considered acceptable product. The splicing methods shall include, but are not limited to, stitching or heat bonding. The finished splice shall maintain the continuity of the filtration function of the geotextile. These methods will be considered viable and acceptable unless otherwise specified.
11. Minimum value of a random 5 sample (MD) average between the polyethylene geonet and the needle punched geotextile.

The Tensar Corporation
1210 Citizens Parkway
Morrow, GA 30260
1-800-845-4453

APPENDIX D
LOAMY SOIL TESTING

D-1 During Construction Loamy Soil Testing

D-1 During Construction Loamy Soil Testing

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
Structural Backfill (August 10, 1995)							
4	storm water on 200' slope, trench 3	80'	12.1	95.7	A	124.8	10.3
5	storm water on 200' slope, trench 3	40'	11.1	96.5	A	124.8	10.3
6	storm water on 200' slope, trench 3	20'	9.0	95.4	A	124.8	10.3
Loamy Soil: Roadways (August 31, 1995)							
7	lower road B at A-5.5	30	6.5	100.2	A	122.8	10.0
8	lower road B at A-8	32	5.3	100.0	A	122.8	10.0
10	lower road B at A-11	35	7.3	95.1	A	122.8	10.0
12	lower road B at A-13	38	6.0	98.0	A	122.8	10.0
14	lower road B at A-15	40	4.3	100.2	A	122.8	10.0
16	lower road B at A-17	42	6.4	99.7	A	122.8	10.0
18	lower road B at A-19	44	7.8	99.3	A	122.8	10.0
Loamy on Road B, 1st Lift, (August 31, 1995)							
7	lower road B at A-5.5 = sta 35+00	30	6.5	100.2	A	122.8	10.0
8	lower road B at A-8 = sta 33+00	32	5.3	100.0	A	122.8	10.0
9	lower road B at A-8, anchor trench	32	7.5	95.9	A	122.8	10.0
10	lower road B at A-11 31+00	35	7.3	95.1	A	122.8	10.0
11	lower road B at A-11, anchor trench	35	7.0	98.8	A	122.8	10.0
12	lower road B at A-13 39+00	38	6.0	98.0	A	122.8	10.0
13	lower road B at A-13, anchor trench	38	6.7	96.9	A	122.8	10.0
14	lower road B at A-15 27+00	40	4.3	100.2	A	122.8	10.0
15	lower road B at A-15, anchor trench	40	7.5	98.7	A	122.8	10.0
16	lower road B at A-17 25+00	42	6.4	99.7	A	122.8	10.0
17	lower road B at A-17, anchor trench	42	4.8	98.7	A	122.8	10.0
18	lower road B at A-19 23+00	44	7.8	99.3	A	122.8	10.0
Loamy on Roads (September 8, 1995)							
1	Road A, survey line A-10 / STA 35+00	12	4.4	99.5	A	122.8	10.0
2	anchor trench adj. to test #1	12	7.5	95.4	A	122.8	10.0
3	Road A, survey line A-12 / STA 33+00	12	4.8	100.0	A	122.8	10.0
4	anchor trench adj. to test #3	12	9.2	89.7	B	122.8	10.0
5	Road A, survey line A-14 / STA 31+00	12	4.8	100.0	A	122.8	10.0
6	anchor trench adj. to test #5	12	8.2	94.2	B	122.8	10.0
7	Road A, survey line A-16 / STA 29+00	12	4.5	100.0	A	122.8	10.0
8	nchor trench adj. to test #7	12	7.0	83.4	B	122.8	10.0
9	Road A, survey line A-18 / STA 27+00	12	4.5	100.0	A	122.8	10.0
10	Road A, survey line A-20 / STA 25+00	14	6.0	100.0	A	122.8	10.0
11	Road A, survey line A-24 / STA 23+00	12	5.1	100.0	A	122.8	10.0
12	Road A, survey line A-26 / STA 21+00	12	6.9	100.0	A	122.8	10.0
13	Road A, survey line A-29 / STA 19+00	12	7.4	100.0	A	122.8	10.0

Prepared by: B. Magliaro/S. Albrecht
Checked by: S. Albrecht 6/22/99

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (September 8, 1995) (continued)						
14	Road A, survey line A-31 / STA 17+00	12	5.3	100.0	A	122.8	10.0
15	lower Road B, survey line A-25 / STA 21+00	46	4.8	100.0	A	122.8	10.0
16	anchor trench adj. to test #5	46	9.2	99.2	A	122.8	10.0
17	lower Road B, survey line A-27 / STA 19+00	44	9.1	96.4	A	122.8	10.0
18	anchor trench adj. to test #17	44	5.5	99.6	A	122.8	10.0
19	lower Road B, survey line A-30 / STA 17+00	42	6.3	100.0	A	122.8	10.0
20	upper Road B, survey line B-0.5 / STA 93+00	78	6.1	100.0	A	122.8	10.0
21	upper Road B, survey line B-3 / STA 91+00	78	5.6	100.0	A	122.8	10.0
22	anchor trench adj. to test #21	78	9.4	93.3	A	122.8	10.0
23	upper Road B, survey line B-5 / STA 89+00	72	6.9	100.0	A	122.8	10.0
24	anchor trench adj. to test #23	72	9.2	87.1	A	122.8	10.0
25	upper Road B, survey line B-7 / STA 87+00	73	6.0	98.5	A	122.8	10.0
26	anchor trench adj. to test #25	73	5.7	100.0	A	122.8	10.0
27	upper Road B, survey line B-9 / STA 85+00	76	6.5	100.0	A	122.8	10.0
28	anchor trench adj. to test #27	76	7.1	96.1	A	122.8	10.0
29	upper Road B, survey line B-11 / STA 83+00	79	7.1	100.0	A	122.8	10.0
30	anchor trench adj. to test #29	79	7.2	95.1	A	122.8	10.0
31	upper Road B, survey line B-13 / STA 81+00	82	6.4	100.0	A	122.8	10.0
32	anchor trench adj. to test #31	82	7.2	95.7	A	122.8	10.0
33	upper Road B, survey line A-26 / STA 78+00	86	4.3	100.0	A	122.8	10.0
34	anchor trench adj. to test #33	86	6.1	100.0	A	122.8	10.0
35	upper Road B, survey line A-27 / STA 77+00	88	4.9	100.0	A	122.8	10.0
36	anchor trench adj. to test #35	88	6.1	100.0	A	122.8	10.0
37	upper Road B, survey line A-30 / STA 75+00	88	5.9	99.3	A	122.8	10.0
38	anchor trench adj. to test #37	88	6.5	97.1	A	122.8	10.0
39	Road C, survey line B-2 / STA 15+00	122	6.6	98.8	A	122.8	10.0
40	Road C, survey line B-6 / STA 17+00	118	6.4	100.0	A	122.8	10.0
41	Road C, survey line B-9 / STA 19+00	119	4.7	100.0	A	122.8	10.0
42	Road C, survey line B-11 / STA 21+00	122	5.9	100.0	A	122.8	10.0
43	Road C, survey line A-29 / STA 23+00	124	4.3	100.0	A	122.8	10.0
44	Road C, survey line A-31 / STA 25+00	121	4.3	100.0	A	122.8	10.0
45	Road C, survey line A-33 / STA 27+00	117	3.7	100.0	A	122.8	10.0
46	Road C, survey line A-35 / STA 29+00	112	3.6	99.8	A	122.8	10.0
47	Road C, survey line A-37 / STA 31+00	110	3.1	100.0	A	122.8	10.0
	3" Minus: Anchor Trench (September 15, 1995)						
14	anchor trench lower road 1st lift A-1	21.5	6.4	100.0	A	122.8	10.0
	3" Minus: Roadway (September 15, 1995)						
13	lower road B 1st lift above line A-1	21.5	5.9	96.2	A	122.8	10.0
15	line 4 lower road B 1st lift above liner	20.5	6.5	100.0	A	122.8	10.0
16	line 4 lower road B 1st lift above anchor trench	20.5	4.6	93.8	B	122.8	10.0
17	line 1 lower road B 1st lift above liner	19.5	6.2	99.7	A	122.8	10.0
18	line E-5 lower road 1st lift above liner	15.5	7.0	97.7	A	122.8	10.0

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	3" Minus: Roadway (September 15, 1995) (continued)						
19	line E-3 lower road 1st lift	16.5	8.7	98.0	A	122.8	10.0
20	line E-0.5 lower road 1st lift	24.5	7.4	100.1	A	122.8	10.0
	Slope Drain - Loamy (September 21, 1995)						
7	80' north MHSP 10	70	8.2	95.1	A	121.9	12.1
8	MHSP 11	63	6.8	97.8	A	121.9	12.1
	Loamy: Slope Drain Pond C (September 29, 1995)						
13	1st lift above down slope drain between SP10-SP11	82.0'	11.3	95.0	A	121.9	10.0
14	2nd lift above down slope drain between SP10-SP11	84.0'	4.7	99.2	A	112.3	9.6
	Loamy: Roadways (September 29, 1995)						
5	upper road B, station A62 / STA 107+00	70.0'	2.8	96.4	A	112.3	9.6
6	upper road B, station A61 / STA 105+00	72.0'	4.5	95.6	A	112.3	9.6
7	upper road B, station A59.5	73.0'	3.5	100.2	A	112.3	9.6
8	upper road B, station F8.5 / STA 104+00	74.0'	5.7	98.4	A	112.3	9.6
9	upper road B, station F7/ STA 103+00	74.0'	3.2	97.7	A	112.3	9.6
10	Road C, station F7 / STA 6+00	97.0'	7.6	98.6	A	116.2	8.7
11	Road C, station F8 / STA 4+00	95.0'	9.9	99.1	A	116.2	8.7
	Loamy: Slope Drain Pond C (October 12, 1995)						
6	30' ne of MH SP#11	66	7.0	95.6	A	112.3	9.6
7	160' ne of MH SP#11	48	6.8	96.2	A	112.3	9.6
8	10' sw of B.O. #4	10	7.1	91.2	B	112.3	9.6
8A	Retest of #8	10	6.2	97.1	C	112.3	9.6
	Loamy Road A (November 28, 1995)						
12	Loamy Road A line A-69	12	10.6	93.9	A	122.8	10.0
13	Loamy Road A line A-68	12	12.3	100.0	A	122.8	10.0
14	Loamy Road A line A-67	12	13.4	94.8	A	122.8	10.0
15	Loamy Road A line A-65	12	17.2	91.8	A	122.8	10.0
16	Loamy Road A line A-64	12	15.4	91.9	A	122.8	10.0
	Loamy on Roads (March 28, 1996)						
1	Road A station 15+00	subgrade	11.2	96.3	A	125.0	9.0
2	Road A station 13+00	subgrade	9.8	99.3	A	125.0	9.0
3	Road A station 11+00	subgrade	9.9	98.2	A	125.0	9.0
4	Road A station 9+00	subgrade	10.1	96.4	A	125.0	9.0

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (March 28, 1996) (continued)						
5	Road A station 7+00	subgrade	6.8	99.8	A	125.0	9.0
6	Road A station 5+00	subgrade	5.0	97.2	A	125.0	9.0
7	Road A station 3+00	subgrade	8.9	97.5	A	125.0	9.0
8	Road A station 1+00	subgrade	8.6	95.9	A	125.0	9.0
9	Road B station 1+00; 1st lift	subgrade	7.8	99.5	A	125.0	9.0
10	Road B station 3+00; 1st lift	subgrade	8.7	98.2	A	125.0	9.0
11	Road B station 5+00; 1st lift	subgrade	8.1	97.3	A	125.0	9.0
12	Road B station 7+00; 1st lift	subgrade	6.3	96.9	A	125.0	9.0
13	Road B station 9+00; 1st lift	subgrade	8.1	97.5	A	125.0	9.0
14	Road B station 11+00; 1st lift	subgrade	4.8	96.8	A	125.0	9.0
15	Road B station 13+00; 1st lift	subgrade	9.6	95.3	A	125.0	9.0
16	Road B station 15+00; 1st lift	subgrade	8.1	96.9	A	125.0	9.0
	Loamy Roads (May 10, 1996)						
1	Road B station 107+00	1	7.3	105.1	A	see Proctor Reports	
2	Road B station 105+00	1	9.7	100.2	A	dated 5/14/96	
3	Road B station 101+00	4	10.5	101.1	A	" "	" "
4	Road B station 99+00	3	10.1	103.6	A	" "	" "
5	Road B station 97+00	4	13.1	97.9	B	" "	" "
6	Road B station 95+00	3	12.3	102.6	A	" "	" "
7	Road B station 73+00	4	12.5	94.3	B	" "	" "
8	Road B station 71+00	3	12.0	98.2	A	" "	" "
9	Road B station 69+00	4	11.9	94.1	B	" "	" "
10	Road B station 67+00	3	12.6	97.7	B	" "	" "
11	Road B station 65+00	1	8.8	102.8	A	" "	" "
12	Road B station 63+00	1	7.8	104.6	A	" "	" "
13	Road B station 61+00	1	7.6	104.8	A	" "	" "
14	Road B station 59+00	1	7.1	103.2	A	" "	" "
15	Road B station 57+00	1	7.6	100.7	A	" "	" "
16	Road B station 55+00	1	6.7	101.4	A	" "	" "
17	Road B station 61+00*	1	6.3	100.4	A	" "	" "
18	Road B station 59+00*	1	7.7	103.2	A	" "	" "
19	Road B station 57+00*	1	8.1	101.4	A	" "	" "
20	Road B station 55+00*	1	7.2	104.1	A	" "	" "
	*should be Lift 3 from 95+00 to 101+00					" "	" "
21	Road B station 53+00	1	6.7	99.6	A	" "	" "
22	Road B station 51+00	1	9.5	94.7	B	" "	" "
23	Road B station 37+00	1	6.6	96.8	A	" "	" "
24	Road B station 1+00	4	6.8	102.9	A	" "	" "
25	Road B station 11+00 (?1+00)	3	7.0	105.2	A	" "	" "
26	Road B station 3+00	4	10.6	99.7	A	" "	" "
27	Road B station 3+00	3	9.9	103.3	A	" "	" "
28	Road B station 5+00	4	10.3	98.2	A	" "	" "
29	Road B station 5+00	3	8.1	105.8	A	" "	" "
30	Road B station 7+00	4	10.0	93.2	B	" "	" "

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (May 10, 1996) (continued)						
31	Road B station 7+00	3	8.5	106.2	A	" "	" "
32	Road B station 9+00	4	9.4	104.7	A	" "	" "
33	Road B station 11+00	4	8.9	100.8	A	" "	" "
34	Road B station 11+00	3	8.0	107.1	A	" "	" "
35	Road B station 13+00	4	14.0	94.8	B	" "	" "
36	Road B station 13+00	3	15.3	99.4	A	" "	" "
37	Road B station 15+00	4	11.8	96.8	B	" "	" "
38	Road B station 15+00	3	12.2	99.8	A	" "	" "
39	Road B station 17+00	4	12.8	93.2	B	" "	" "
40	Road B station 17+00	3	13.2	101.3	A	" "	" "
41	Road B station 19+00	4	14.7	96.1	A	" "	" "
42	Road B station 19+00	3	12.7	105.7	A	" "	" "
43	Road B station 21+00	4	13.9	99.1	A	" "	" "
44	Road B station 21+00	3	14.2	102.9	A	" "	" "
	May 29, 1996						
1	station 1+00	lift 3	6.3	107.6	A	117.0	10.3
2	station 1+00	lift 4	6.3	92.3	B	117.0	10.3
3	station 7+00	lift 3	5.3	110.3	A	117.0	10.3
4	station 9+00	lift 3	4.8	107.7	A	117.0	10.3
5	station 13+00	lift 3	7.7	101.6	A	117.8	11.4
6	station 15+00	lift 3	6.3	104.2	A	117.8	11.4
7	station 17+00	lift 3	6.1	106.6	A	117.8	11.4
8	station 19+00	lift 3	5.4	104.8	A	117.8	11.4
9	station 23+00	lift 3	6.4	115.0	A	110.8	10.4
10	station 23+00	lift 4	8.2	106.5	A	110.8	10.4
11	station 25+00	lift 3	6.5	115.3	A	110.8	10.4
12	station 25+00	lift 4	6.3	108.1	A	110.8	10.4
13	station 27+00	lift 3	9.2	104.7	A	110.8	10.4
14	station 27+00	lift 4	9.9	98.4	A	110.8	10.4
15	station 29+00	lift 3	7.8	111.5	A	110.8	10.4
16	station 29+00	lift 4	8.2	108.3	A	110.8	10.4
17	station 31+00	lift 3	5.8	94.6	*	124.1	11.3
18	station 31+00	lift 4	5.8	96.8	*	124.1	11.3
19	station 33+00	lift 3	8.1	95.*	*	124.1	11.3
20	station 33+00	lift 4	8.6	9*.*	*	124.1	11.3
21	station 35+00	lift 3	7.4	*	*	124.1	11.3
22	station 35+00	lift 4	7.7	*	*	124.1	11.3
23	station 37+00	lift 3	5.8	*	*	124.1	11.3
24	station 37+00	lift 4	7.?	*	*	124.1	11.3
25	station 39+00	lift 3	7.5	96.1	B	124.1	11.3
26	station 39+00	lift 4	7.1	98.6	A	124.1	11.3
27	station 41+00	lift 3	7.6	100.2	A	124.0	8.5
28	station 41+00	lift 4	7.5	94.4	B	124.0	8.5
29	station 43+00	lift 2	5.1	95.4	B	124.0	8.5

Prepared by: B. Magliaro/S. Albrecht
Checked by: S. Albrecht 6/22/99

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
			May 29, 1996 (continued)				
30	station 43+00	lift 3	5.3	98.0	A	124.0	8.5
31	station 45+00	lift 2	4.7	103.5	A	124.0	8.5
32	station 46+00	lift 3	5.0	99.4	A	124.0	8.5
33	station 47+00	lift 2	5.2	104.7	A	124.0	8.5
34	station 47+00	lift 3	4.5	109.5	A	124.0	8.5
35	station 49+00	lift 2	6.6	95.6	B	124.0	8.5
36	station 49+00	lift 3	8.3	99.4	A	119.2	9.6
37	station 51+00	lift 3	7.7	100.2	A	119.2	9.6
38	station 53+00	lift 2	6.9	107.7	A	119.2	9.6
39	station 53+00	lift 3	7.7	103.5	A	119.2	9.6
40	station 55+00	lift 2	7.7	103.6	A	119.2	9.6
41	station 55+00	lift 3	8.8	97.1	B	119.2	9.6
42	station 57+00	lift 2	5.5	102.2	A	119.2	9.6
43	station 57+00	lift 3	5.5	98.7	A	119.2	9.6
44	station 59+00	lift 2	5.3	108.7	A	119.2	9.6
45	station 59+00	lift 3	5.5	103.6	A	119.2	9.6
46	station 61+00	lift 2	4.3	108.2	A	120.2	12.8
47	station 61+00	lift 3	5.6	106.8	A	120.2	12.8
48	station 63+00	lift 3	5.4	108.6	A	120.2	12.8
49	station 63+00	lift 3	5.7	105.5	A	120.2	12.8
50	station 65+00	lift 2	5.8	111.6	A	120.2	12.8
51	station 65+00	lift 3	6.3	107.3	A	120.2	12.8
52	station 67+00	lift 2	5.7	105.2	A	120.2	12.8
53	station 67+00	lift 3	6.3	102.0	A	120.2	12.8
54	station 69+00	lift 2	6.1	99.6	A	120.2	12.8
55	station 69+00	lift 3	6.2	100.0	A	120.2	12.8
56	station 71+00	lift 3	6.4	103.2	A	119.7	12.5
57	station 71+00	lift 4	7.6	100.5	A	119.7	12.5
58	station 73+00	lift 3	6.9	108.8	A	119.7	12.5
59	station 73+00	lift 4	8.1	106.0	A	119.7	12.5
60	station 75+00	lift 3	6.9	102.8	A	119.7	12.5
61	station 75+00	lift 4	6.8	93.5	B	119.7	12.5
62	station 77+00	lift 3	5.5	102.4	A	119.7	12.5
63	station 77+00	lift 4	6.7	98.9	A	119.7	12.5
64	station 79+00	lift 3	7.1	100.9	A	119.7	12.5
65	station 79+00	lift 4	7.3	93.3	B	119.7	12.5
66	station 91+00	lift 3	8.6	103.0	A	119.7	12.5
67	station 91+00	lift 4	11.0	96.3	B	119.7	12.5
68	station 81+00	lift 3	7.7	94.7	B	123.8	10.7
69	station 81+00	lift 4	8.3	93.9	B	123.8	10.7

COMMENTS:

A. Test results comply with specifications

B. Recompaction required

C. Test is after recompaction

* Values to be provided by NYCDEP

APPENDIX E
TOPSOIL TESTING

E-1 Topsoil Testing – pH, TOC, Grain Size Analysis

E-2 Topsoil Testing – Nutrient Analysis

E-3 Topsoil Analysis – pH Adjustment

E-1 Topsoil Testing – pH, TOC, Grain Size Analysis

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-44	MC-43	MC-42	MC-41	MC-40	MC-39	MC-38	MC-37
Sample ID	061801	061701	061501	061201	061101	061001	060901	060801
Sample Date	06/18/98	06/17/98	06/15/98	06/12/98	06/11/98	06/10/98	06/09/98	06/08/98
pH	6.8	7.2	6.7	6.8	6.3	6.5	7.2	6.9
TOC*	6.0%	7.7%	7.7%	7.9%	7.0%	8.4%	5.7%	6.4%
Grain Size Analysis								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"				100.0		100.0	100.0	
3/4"		100.0	100.0	98.4	100.0	98.5	99.0	100.0
1/2"	100.0	98.8	99.5	97.9	98.7	93.5	96.9	98.7
3/8"	99.2	96.4	99.5	97.2	96.6	90.8	94.3	96.9
1/4"	96.7	92.6	97.7	95.1	93.5	87.3	90.8	93.9
#4	94.1	89.6	95.8	93.1	91.0	84.6	88.5	91.7
#8	85.8	81.4	90.6	88.2	84.3	79.8	83.3	84.7
#10	83.6	80.2	88.7	86.4	82.2	78.1	81.9	83.2
#16	77.7	72.4	81.9	81.7	75.5	72.6	78.4	75.5
#20	73.8	68.0	76.6	78.1	70.7	69.5	72.9	71.3
#30	68.5	62.6	69.6	73.0	64.0	64.3	67.0	62.9
#35	66.1	61.4	67.7	71.7	63.0	63.0	66.1	62.6
#40	61.9	57.8	62.8	67.8	58.9	58.5	61.1	59.2
#50	56.6	51.4	55.1	61.4	52.0	51.6	55.6	52.1
#60	51.6	47.3	49.4	58.6	47.0	46.8	50.8	47.1
#80	43.3	40.0	44.0	49.0	39.6	39.9	43.3	39.3
#100	38.3	35.5	35.7	44.0	34.9	35.5	38.8	34.7
#200	21.0	21.5	19.8	27.4	20.6	22.2	22.9	21.6
#270	14.4	15.1	12.8	19.7	14.3	16.6	12.1	16.3

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-36	MC-35	MC-34	MC-33	MC-32	MC-30	MC-31	MC-29
Sample ID	060501	060401	060301	060201	060101	052901	0529PB	052801
Sample Date	06/05/98	06/04/98	06/03/98	06/02/98	06/01/98	05/29/98	05/29/98	05/28/98
pH	6.9	7.0	7.4	6.8	6.8	7.1	7.0	6.6
TOC*	6.7%	6.9%	7.2%	4.8%	7.1%	7.3%	10.6%	6.6%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"						100.0	100.0	
3/4"	100.0	100.0	100.0	100.0	100.0	99.8	98.4	100.0
1/2"	99.4	95.7	96.8	98.9	98.6	98.2	93.6	98.7
3/8"	97.0	92.5	96.0	98.2	98.0	96.7	90.8	96.6
1/4"	92.7	89.4	92.9	96.3	95.1	92.0	87.7	93.4
#4	89.7	86.9	90.8	94.6	92.1	90.8	86.1	91.8
#8	82.6	71.3	85.1	88.8	85.7	84.7	82.2	86.2
#10	80.9	80.1	83.9	87.3	84.4	83.6	81.1	85.4
#16	75.2	74.9	78.7	81.0	79.7	79.7	76.8	80.2
#20	71.1	71.0	74.7	77.8	76.3	77.0	73.8	76.5
#30	64.8	64.5	68.9	70.7	70.7	72.5	67.6	70.3
#35	63.8	63.2	63.4	70.5	69.9	71.1	65.9	67.7
#40	51.9	58.6	56.0	67.1	66.0	65.6	61.0	63.2
#50	47.7	51.1	53.2	59.8	58.9	61.5	53.1	54.8
#60	44.1	48.1	51.6	54.6	53.8	57.4	47.9	49.5
#80	40.2	39.0	43.2	45.9	45.4	50.3	39.8	41.1
#100	33.8	34.7	37.6	40.4	40.1	45.9	35.3	35.4
#200	20.0	22.2	22.3	23.9	24.4	30.7	22.6	25.7
#270	14.8	17.0	17.2	17.2	17.3	23.8	17.2	19.9

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-28	MC-27	MC-24	MC-25	MC-26	MC-23	MC-22	MC-20
Sample ID	052701	052201	052001	052002	052003	0501801	0501401	0501201
Sample Date	05/27/98	05/22/98	05/20/98	05/20/98	05/20/98	05/18/98	05/14/98	05/12/98
pH	6.8	7.2	6.8	6.5	6.9	6.9	6.9	6.4
TOC*	7.2%	6.2%	5.7%	3.6%	6.7%	5.6%	4.9%	5.2%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0			100.0			
3/4"	99.6	97.0	100.0		97.6	100.0	100.0	100.0
1/2"	97.4	95.7	99.0	100.0	95.7	99.4	99.2	97.7
3/8"	96.3	93.4	99.0	99.8	94.9	97.6	98.6	97.1
1/4"	93.5	91.0	97.4	99.0	93.2	94.6	96.8	95.4
#4	91.5	88.7	96.2	98.2	92.1	93.1	95.5	94.1
#8	85.6	84.1	92.1	94.9	87.9	88.6	92.4	90.4
#10	83.6	82.8	90.4	93.5	86.4	87.2	91.3	89.2
#16	76.6	78.2	84.9	88.8	81.8	82.0	87.9	85.5
#20	72.2	74.8	80.5	85.4	78.4	77.8	85.2	82.7
#30	68.5	69.6	74.5	80.4	73.6	71.9	80.1	78.5
#35	66.9	68.3	72.5	78.6	72.1	70.0	79.2	76.9
#40	62.5	64.3	67.7	74.5	68.1	66.7	75.6	73.4
#50	57.4	57.9	59.9	67.6	61.7	58.9	69.9	67.7
#60	53.5	53.5	54.2	62.3	57.0	54.0	65.6	63.6
#80	43.5	46.1	45.1	53.3	48.8	46.1	58.4	56.4
#100	38.9	41.7	39.6	47.6	43.7	41.3	53.3	51.7
#200	32.0	26.8	31.3	28.3	26.7	26.4	35.4	34.2
#270	24.0	20.0	19.8	20.6	19.2	17.6	26.5	26.7

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-21	MC-19	MC-18	MC-17	MC-16	MC-15	MC-14	MC-13
Sample ID	0501202	050701	050501	050101	042801	042401	042101	041701
Sample Date	05/12/98	05/07/98	05/05/98	05/01/98	04/28/98	04/24/98	04/21/98	04/17/98
pH	6.5	6.6	6.9	7.0	6.4	6.2	6.7	6.2
TOC*	4.6%	5.3%	4.5%	6.4%	6.6%	5.0%	6.2%	4.9%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"					100.0			
3/4"	100.0	100.0	100.0	100.0	98.3	100.0	100.0	
1/2"	99.5	98.0	99.2	97.4	95.3	98.9	97.5	100.0
3/8"	98.9	96.9	98.2	96.2	94.4	96.3	96.6	99.5
1/4"	96.3	94.9	95.1	94.2	92.9	94.0	94.8	96.0
#4	94.6	93.2	93.8	92.7	91.4	92.3	92.9	93.7
#8	90.1	89.2	89.1	88.4	86.7	87.9	88.6	88.7
#10	89.0	88.0	88.0	87.0	85.0	86.5	87.3	87.0
#16	85.3	84.1	83.5	82.9	79.4	82.8	83.3	80.5
#20	82.3	80.1	79.9	79.8	74.7	79.4	80.2	76.1
#30	77.7	75.9	74.8	75.8	68.0	75.6	75.7	70.4
#35	76.8	74.5	73.9	73.7	66.2	72.6	73.9	68.4
#40	71.8	70.1	70.1	70.0	60.0	69.2	70.1	64.0
#50	65.2	64.0	83.8	63.9	53.2	63.0	63.8	57.3
#60	60.4	59.3	59.3	59.5	47.9	58.5	59.3	52.6
#80	52.7	51.7	51.8	52.0	39.8	51.1	51.5	45.1
#100	47.9	46.8	46.9	47.2	34.9	46.5	46.7	40.5
#200	31.3	29.7	29.5	30.2	20.5	30.6	30.2	25.5
#270	23.5	22.7	21.9	22.2	13.1	23.2	23.0	19.5

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	ITL	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001			FVG-001	FVG-001
Report#	MC-12	MC-10	MC-11	MC-09			MC-08	MC-07
Sample ID	041401	041001	041002	040801	040601	040301	033101	033102
Sample Date	04/14/98	04/10/98	04/10/98	04/08/98	04/06/98	04/03/98	03/31/98	03/31/98
pH	6.2	6.5	6.4	6.0	7.4	7.0 / 7.7	6.7	6.4
TOC*	6.1%	5.6%	3.7%	5.7%	3.8%	2.3% / 2.6%	3.8%	3.9%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0	100.0	100.0			100.0	100.0
3/4"	100.0	100.0	97.7	100.0			100.0	99.8
1/2"	100.0	98.7	96.4	97.9	100.0	100.0	98.7	99.2
3/8"	99.9	96.7	95.6	94.4	97.9	99.1	96.6	96.9
1/4"	97.8	93.4	93.9	91.1			93.5	93.8
#4	96.6	90.0	91.8	88.6	95.7	95.7	91.3	92.0
#8	89.5	82.2	86.7	83.1			85.6	86.2
#10	88.4	80.2	85.0	80.3	90.0	89.9	84.0	84.2
#16	82.8	75.1	79.4	71.9	85.5	86.2	78.7	78.8
#20	77.2	71.6	75.2	65.2			74.7	74.3
#30	70.0	65.8	69.4	56.9			68.4	67.8
#35	69.3	64.6	87.5	54.3			67.6	66.2
#40	65.7	60.3	63.2	49.8	70.0	73.0	64.3	62.9
#50	58.7	53.3	58.2	43.0	63.5	66.9	57.8	56.2
#60	53.9	48.2	51.1	38.5			52.3	50.8
#80	46.1	40.0	42.7	31.4			44.7	42.5
#100	41.3	35.1	37.7	27.3	46.0	49.8	39.3	37.3
#200	26.6	20.6	23.0	15.5	33.8	35.5	22.8	21.4
#270	20.3	14.3	17.0	10.3			17.1	14.4

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	ITL	ITL
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001		
Report#	MC-08	MC-01	MC-02	MC-03	MC-04	MC-05		
Sample ID	033103	032501	032502	032503	032504	032505	030401	030201
Sample Date	03/31/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/04/98	03/02/98
pH	6.5	6.8	6.1	7.2	7.3	6.5	6.7	7.3
TOC*	3.8%	7.5% / 1.9%[1]	6.3%	8.5%	9.8%	6.6%	7.2%	4.3%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0	100.0	100.0	100.0	100.0		
3/4"	100.0	100.0	100.0	100.0	100.0	100.0		
1/2"	99.5	98.7	99.5	98.9	98.1	100.0	100.0	100.0
3/8"	98.6	98.2	98.9	98.0	97.5	100.0	97.6	99.3
1/4"	95.9	96.1	97.7	96.0	95.0	99.5		
#4	95.1	95.0	96.3	94.0	93.5	98.4	93.4	93.1
#8	90.2	94.4	91.2	88.8	88.8	94.1		
#10	88.8	90.7	89.8	87.4	87.2	92.6	88.1	86.8
#16	83.6	87.8	84.1	83.0	83.1	87.8	83.9	83.2
#20	80.4	85.7	80.2	76.0	80.0	84.6		
#30	75.8	82.5	75.3	70.5	76.2	79.7		
#35	74.4	80.1	71.8	68.6	73.7	78.1		
#40	71.3	78.2	68.4	66.7	70.6	75.1	68.1	70.8
#50	65.8	73.0	61.5	62.7	64.4	66.9	60.8	65.1
#60	61.0	68.8	56.9	59.5	60.0	64.4		
#80	53.7	61.2	49.1	51.5	52.3	51.5		
#100	48.6	55.8	44.7	46.6	47.3	46.7	43.6	49.6
#200	30.3	36.0	29.7	29.4	30.8	34.5	23.8	26.9
#270	23.0	28.5	23.4	23.3	23.8	28.7		

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	ITL	ITL	ITL	ITL	ITL	ITL	ITL	ITL
LAB#								
Report#								
Sample ID	022301	022302	021901	021902	021701	021702	021301	021101
Sample Date	02/23/98	02/23/98	02/19/98	02/19/98	02/17/98	02/17/98	02/13/98	02/11/98
pH	7.1	7.3	7.5	7.5	7.5	7.6	7.2	7.4
TOC*	4.9%	6.4%	6.3%	3.3%(2)	9.3%	8.9%	13.1%	10.2%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"					100.0			
3/4"	100.0	100.0	100.0		97.4	100.0	100.0	100.0
1/2"			99.2	100.0	97.4	98.8	100.0	98.4
3/8"	95.2	99.7	97.0	99.3	96.2	97.4	96.9	97.2
1/4"								
#4	90.5	95.5	89.0	96.3	92.3	93.0	91.6	92.5
#8								
#10	69.0	79.3	76.0	88.5	85.0	85.7	83.9	85.1
#16	63.4	64.1	72.7	84.2	79.9	81.1	79.5	74.2
#20								
#30								
#35								
#40	38.8	39.2	61.5	69.5	63.0	65.7	65.6	45.8
#50	30.2	30.7	56.2	62.5	55.8	57.9	59.3	37.9
#60								
#80								
#100	18.4	18.9	42.8	48.1	38.7	41.6	43.5	23.8
#200	12.9	14.8	25.8	33.6	28.7	29.3	29.3	13.7
#270								

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	ITL	ITL	ITL	ITL	ITL	ITL	ITL
LAB#							
Report#							
Sample ID	021001	020901	020601	020602	020603	#1	#2
Sample Date	02/10/98	02/09/98	02/06/98	02/06/98	02/06/98	02/16/98	02/16/98
pH	7.4	7.3	6.7	7.4	7.5		
TOC*	10.5%	6.2%	5.5%	13.5%	7.9%		
Grain Size Analysi							
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"						100.0	100.0
3/4"		98.9		100.0	100.0	98.1	99.1
1/2"	100.0	97.9	100.0	98.0	96.1	96.4	95.1
3/8"	98.1	95.4	98.3	95.5	95.1	95.3	92.5
1/4"							
#4	93.4	89.9	94.2	91.2	90.7	92.0	87.9
#8							
#10	83.2	81.6	87.9	85.0	84.4	86.3	81.9
#16	70.8	69.9	83.2	81.0	79.9	82.0	77.9
#20							
#30							
#35							
#40	35.9	30.8	65.7	65.5	63.5	64.6	62.9
#50	31.2	24.6	58.1	58.6	56.3	56.6	56.5
#60							
#80							
#100	18.1	13.8	40.9	42.9	40.5	38.5	41.0
#200	10.7	9.5	29.6	31.9	30.0	26.3	29.1
#270							

Notes:

* TOC = Total Organic Carbon

(1) Original result 7.5%, 1.9% on re-test

(2) This is an increase in weight of soil, therefore Total Organic Content by this method (ASTM D-2974), is not possible.

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

E-2 Topsoil Testing – Nutrient Analysis

TOPSOIL ANALYSIS - pH ADJUSTMENT
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

			SAMPLE DATE				SAMPLE DATE	
			8/25/97	9/2/97	9/15/97		10/2?/97	
AREA#	ACREAGE	DATE OF FIRST SULFUR APPLICATION	pH			DATE OF SECOND SULFUR APPLICATION	pH	CO3
1	1.6	7/29	7.5	--	7.8		7.5	6.22
2	1.8	7/28	7.8	8.2	8.1		7.8	2.93
3	2.5	7/28	7.8	8.4	7.9		7.5	5.44
4	3.0	7/28	7.9	7.9	9.4		7.8	3.38
5	3.0	7/28-7/29	8.6	8.1	9.8		7.9	4.17
6	2.3	7/28-7/30	7.8	8.3	9.3		8.0	3.44
7	2.8	7/28-7/29	8.0	8.0	7.4		8.4	5.49
8	2.8	7/29-8/01	8.0	7.9	8.4		7.9	5.64
9	2.8	7/30-8/01	8.5	8.7	7.9		7.8	3.97
10	2.8	7/30	8.1	8.6	7.5		7.9	2.73
11	3.2	7/30	8.5	7.5	7.5		7.4	3.17
12	3.0	7/31	9.1	7.1	7.2		7.3	3.34
13	5.3	7/31	7.8	7.7	7.6		7.6	4.64
14	3.7	8/4,8/7	8.0	7.6	7.6		7.3	6.87
15	4.0	8/4,8/7	8.5	8.7	7.8		7.4	6.29
16	3.0	8/4,8/7	7.8	7.8	7.7		7.3	7.22
17	3.1	8/5,8/7	8.0	8.2	8.6		7.6	8.92
18	3.9	8/5,8/7	7.9	8.0	7.8		7.5	5.74
19	3.7	8/5,8/7	7.8	7.8	8.5		7.6	3.54
20	3.0	8/5,8/6	8.1	8.7/7.9	8.7		7.5	5.94
21	4.1	8/5,8/6	7.7	7.7	7.8		7.4	5.99
22	3.2	8/6	8.0	8.5	8.1		7.2	5.56
23	3.2	8/6	8.0	9.8	8.3		8.0	7.58
24	3.0	8/1, 8/6	7.9	8.0	9.7		7.7	7.56
25	3.0	8/1, 8/6	7.9	8.5	8.3		7.7	8.87
26	4.8	8/1, 8/7	8.1	8.6	8.1		7.7	5.39
27	2.0	8/1, 8/4	7.8	7.8	8.2		7.6	7.75

E-3 Topsoil Analysis – pH Adjustment

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES
Lab#	5576	5577	5579	5580	5578	5581	5716	5717
Sample ID	PBTS19/8/97	PBTS1	PBTS2	PBTS39/8/97	PBTS29/8/97	PBTS3	1A1	1A2
Sample Date	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/15/97
Soil Test								
Soil Texture	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam
Soil pH [1]	7.5	7.6	8.2	7.3	7.9	6.8	7.8	7.8
Essential Nutrients (lbs/acre) [2]								
Phosphorus	125	133	91 [3]	125	83 [3]	46 [3]	86 [3]	94 [3]
Potassium	407	460	326	516	201 [3]	147 [3]	194 [3]	199 [3]
Magnesium	547	511	621	446	520	220 [3]	516	540
Calcium	4093	4180	10620	5083	4019	1433 [3]	3513	3758
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trace Nutrients (ppm) [4]								
Copper	4.9	5.2	4	3.3	3.1	1.4	2.7	2.8
Manganese	49.7	48	39	73.2	61.9	108.2 [5]	48.2	56.8
Zinc	18.7	20.1	24.4	17.1	13.5	4.1	12.7	14.8
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.0 neutral, 7.1 - 7.3 - very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

[4] Unless noted, values are considered adequate for plant growth.

[5] Values are considered high; above range for plant growth.

[6] Acceptability for plant growth not indicated.

Note:

NJAES = New Jersey Agricultural Experiment Station

CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

? = Data not legible

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	CNAL	ITL	ITL	NJAES	NJAES
Lab#	5718	5719	6485	4264-47 (H)	A3341-1	A3341-2	539	540
Sample ID	2A1	2A2	100907	280410	B7/S-5.20-22	B7/S-4.15-17	20604	20605
Sample Date	9/15/97	9/15/97	10/9/97	10/9/97	12/16/97	12/16/97	2/6/98	2/6/98
Soil Test								
Soil Texture	sandy loam	sandy loam	sandy loam	N/A	N/A	N/A	sandy loam	sandy loam
Soil pH [1]	7.8	7.8	8.1	7.0	N/A	N/A	7.8	7.7
Essential Nutrients (lbs/acre) [2]								
Phosphorus	88 [3]	82 [3]	102	43 [3]	90.7 (ppm) [6]	83.2 (ppm) [6]	137	218
Potassium	187 [3]	174 [3]	163 [3]	140 [3]	241 (ppm) [6]	223 (ppm) [6]	845	1014
Magnesium	503	481	623	840	N/A	N/A	722	909
Calcium	3553	3374	4928	6600	N/A	N/A	9483	11735
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A	369 (ppm) [6]	395 (ppm) [6]	n	N/A
Trace Nutrients (ppm) [4]								
Copper	2.7	2.5	3.5	N/A	N/A	N/A	11.4	23.5 [5]
Manganese	53.9	47.5	50.8	32.0	N/A	N/A	38.4	47.5
Zinc	11.8	11.3	18.8	?	N/A	N/A	44.4	56.2 [5]
Aluminum	N/A	N/A	N/A	36.0	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	8.0	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.1 - 7.3 very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

[4] Unless noted, values are considered adequate for plant growth.

[5] Values are considered high; above range for plant growth.

[6] Acceptability for plant growth not indicated.

Note:

NJAES = New Jersey Agricultural Experiment Station

CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	NJAES
Lab#	541	774	775	776
Sample ID	20606	21711	21712	21713
Sample Date	2/6/98	2/17/98	2/17/98	2/17/98
Soil Test				
Soil Texture	sandy loam	sandy loam	sandy loam	sandy loam
Soil pH [1]	7.6	7.7	7.8	7.9
Essential Nutrients (lbs/acre) [2]				
Phosphorus	221	209	252	175
Potassium	1099	966	1186	987
Magnesium	981	781	934	732
Calcium	10230	7422	7286	6038
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A
Trace Nutrients (ppm) [4]				
Copper	21.7 [5]	4.1	5.5	3.7
Manganese	45.0	45.4	40.3	32.4
Zinc	49.3	32.3	45.1	29.6
Aluminum	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.1 - 7.3 very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

[4] Unless noted, values are considered adequate for plant growth.

[5] Values are considered high; above range for plant growth.

[6] Acceptability for plant growth not indicated.

Note:

NJAES = New Jersey Agricultural Experiment Station

CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

APPENDIX F
PHOTOS

Photo No. 1 – Construction of Concrete Slurry Wall Cap
Photo No. 2 – View of Pond B and Landfill Geomembrane Layer
Photo No. 3 – Installation of Smooth HDPE Geomembrane at Top of Landfill
Photo No. 4 – Seaming of Textured and smooth HDPE Membrane at Top of Landfill
Photo No. 5 – Detail of LFG Vent Boot
Photo No. 6 – Installation of 24" Diameter Pipe Downchute
Photo No. 7 – Geocomposite Layer
Photo No. 8 – LFG Collection Pipe Installation over Geocomposite Layer (with Geogrid Reinforcement)
Photo No. 9 – Installation of 30" Diameter HDPE Pipe Connection between Ponds B and C
Photo No. 10- Roadway Construction
Photo No. 11- Installation of Barrier Protection Material over Geocomposite Layer
Photo No. 12- Covering LFG Collection Line with Barrier Protection Material
Photo No. 13- Installation of LFG Flare Station
Photo No. 14- Construction of Swale E
Photo No. 15- Access Roadway and Drainage Swale
Photo No. 16- Construction of Topsoil Layer

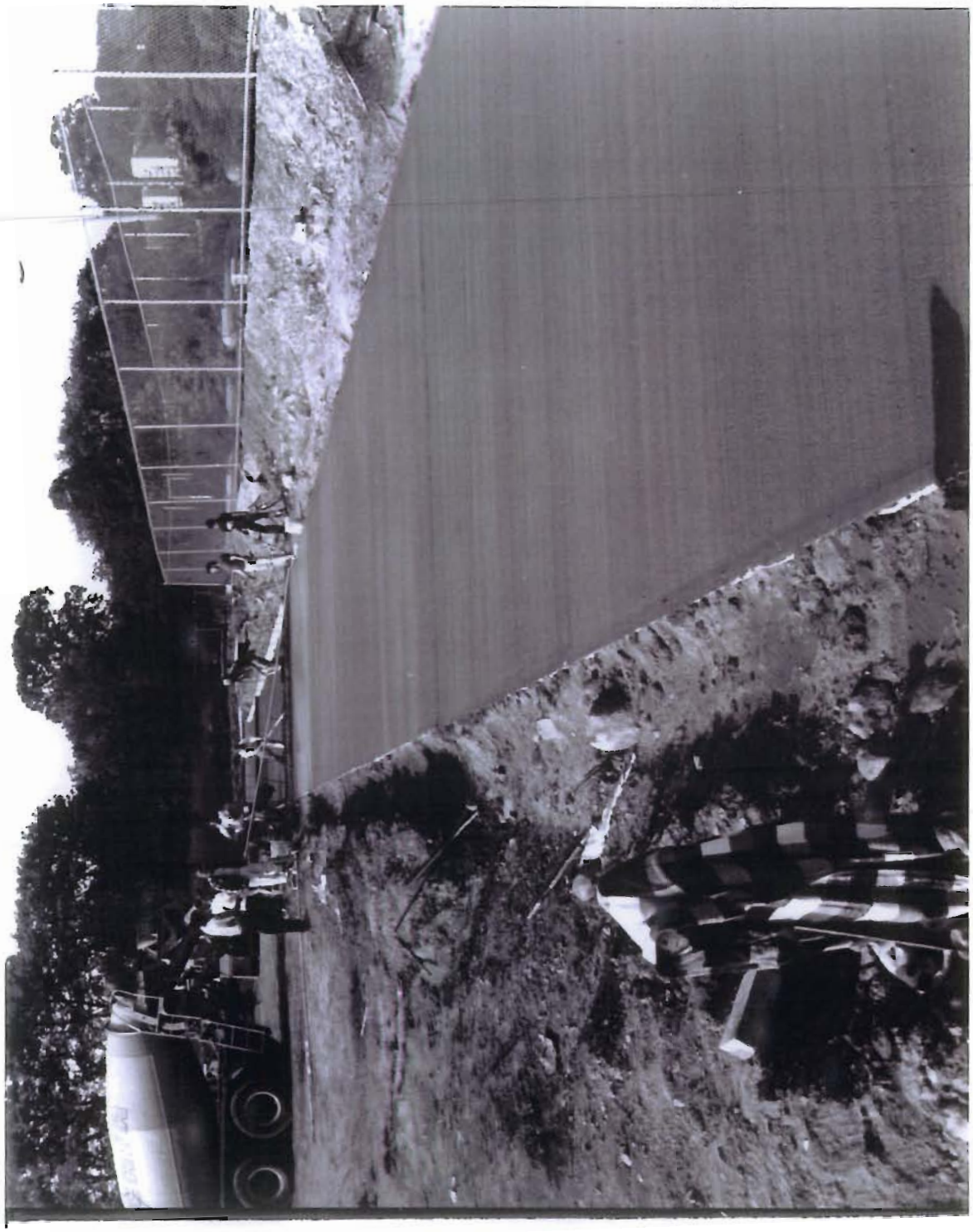


Photo No.1. Construction of Concrete Slurry Wall Cap. (October 14, 1994)

Photo No. 2. View of Pond B and Landfill Geomembrane Layer. (August 18, 1995)

Photo No. 3. Installation of Smooth HDPE Geomembrane at Top of Landfill
(November 1, 1995)

Photo No. 4. Seaming of Textured and Smooth HDPE Geomembrane at Top of Landfill (September 27, 1995)

Photo No. 5. Detail of LFG Vent Boot. (May 11, 1995)

Photo No. 6. Installation of 24" Diameter Pipe Downchute. (June 7, 1995)

Photo No. 7. Geocomposite Layer. (June 26, 1995)

Photo No. 8. LFG Collection Pipe Installation over Geocomposite Layer (with Geogrid Reinforcement). (August 1, 1995)

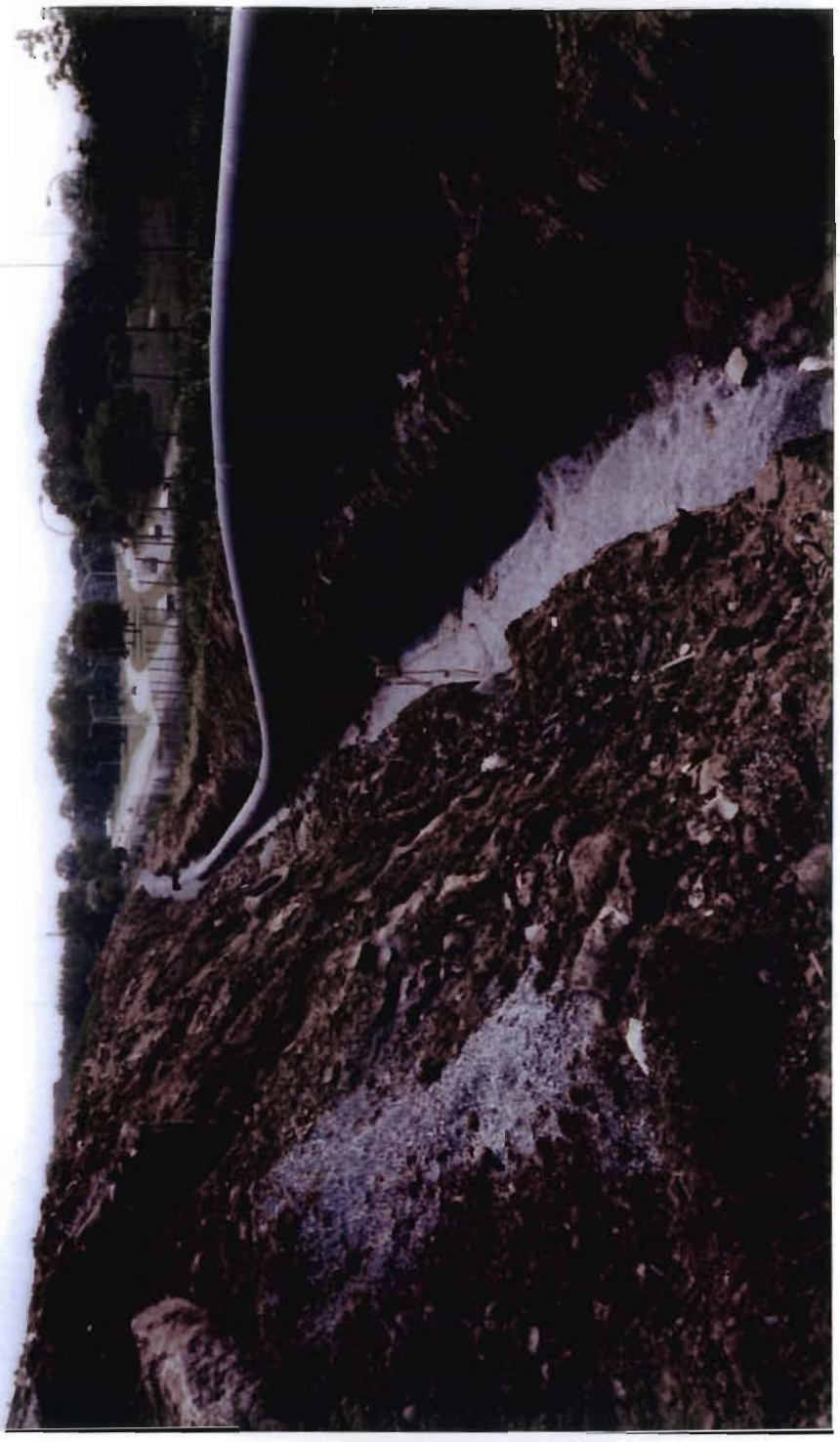


Photo No. 9. Installation of 30" Diameter HDPE Pipe Connection between Ponds B and C. (June 7, 1995)

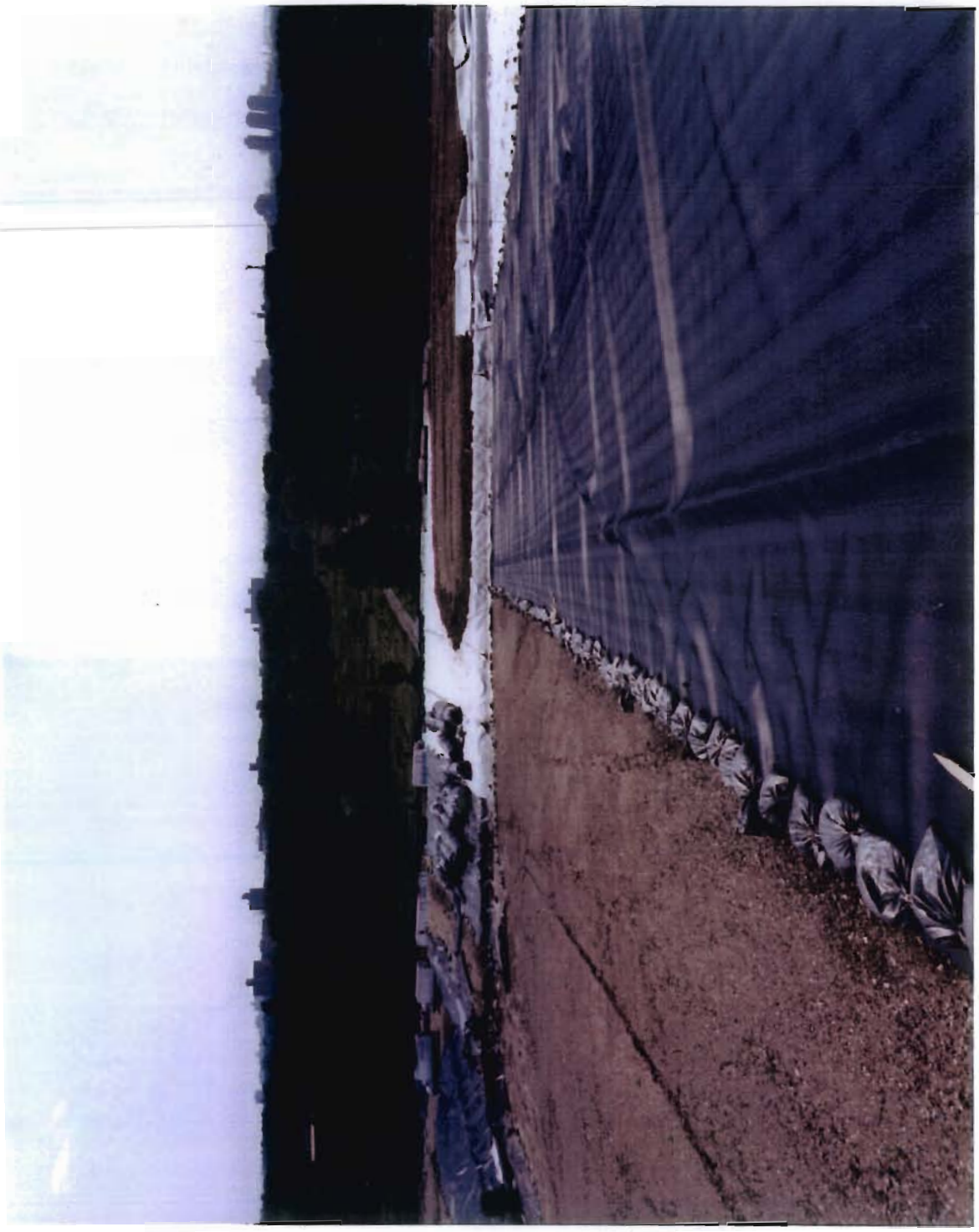


Photo No. 10. Roadway Construction. (June 7, 1995)

Photo No. 11. Installation of Barrier Protection Material over Geocomposite Layer.
(September 27, 1995)

Photo No. 12. Covering LFG Collection Line with Barrier Protection Material.
(July 12, 1995)

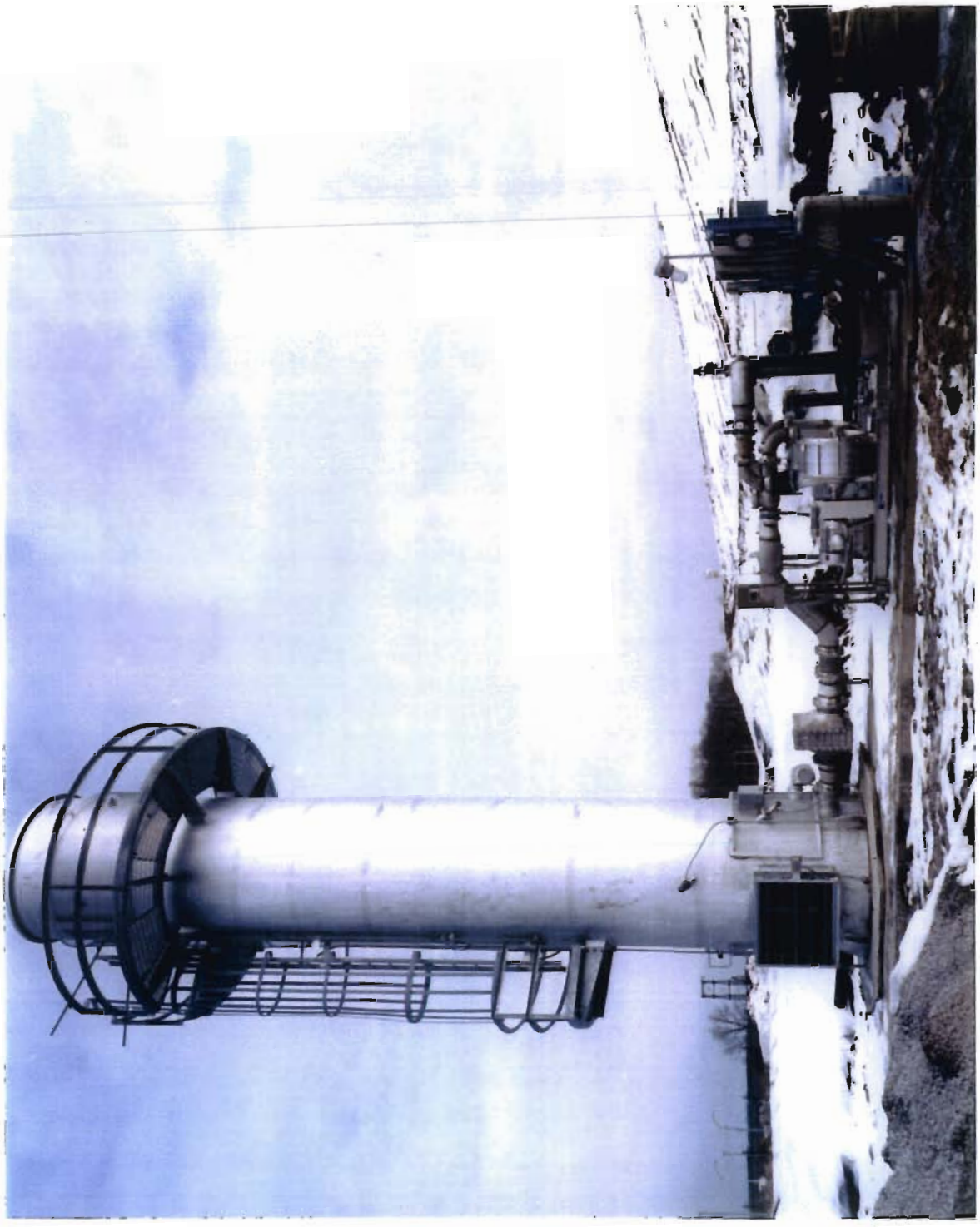


Photo No. 13. Installation of LFG Flare Station. (February 15, 1996)

Photo No. 14. Construction of Swale E. (August 21, 1996)

Photo No. 15. Access Roadway and Drainage Swale. (May 20, 1998)

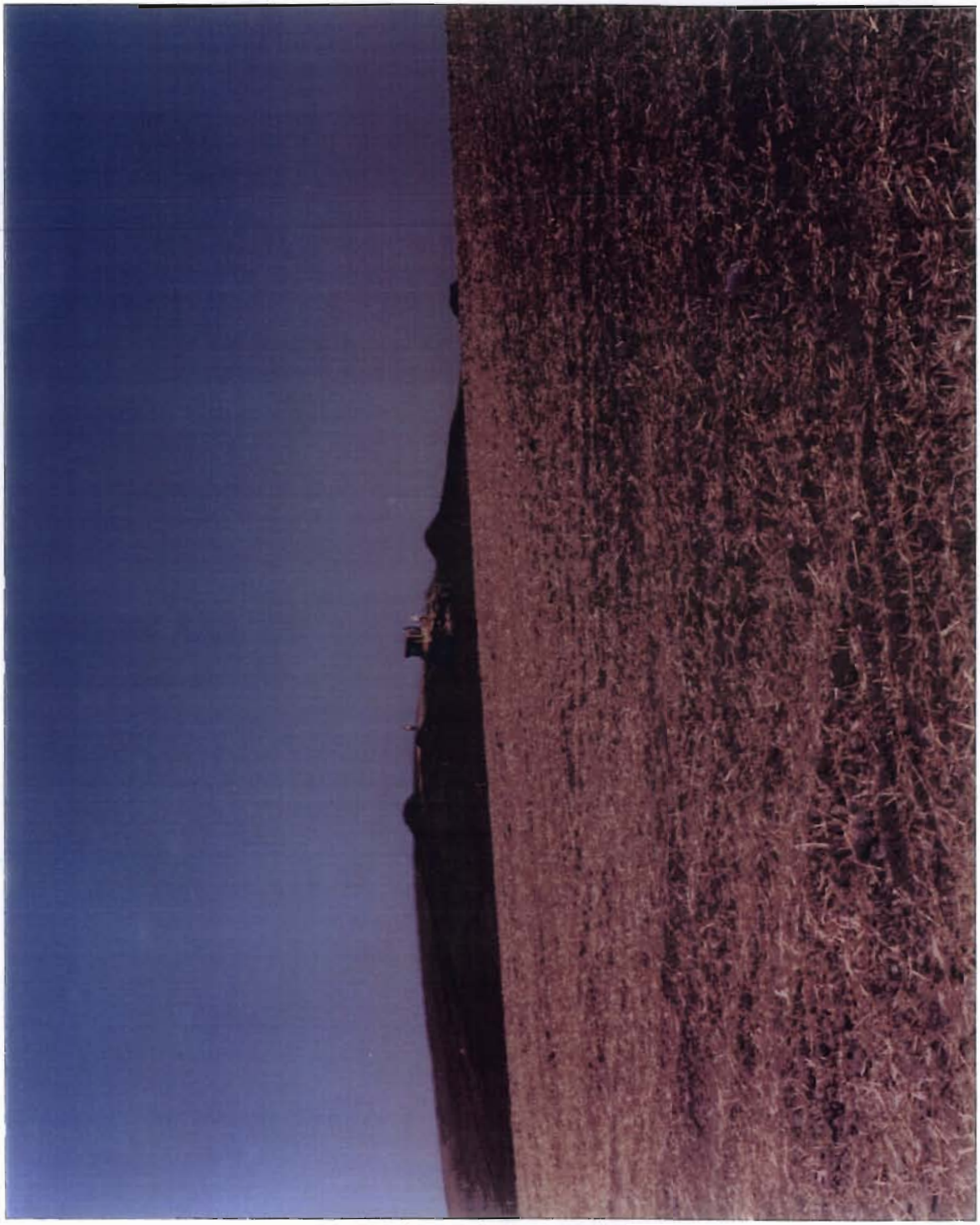
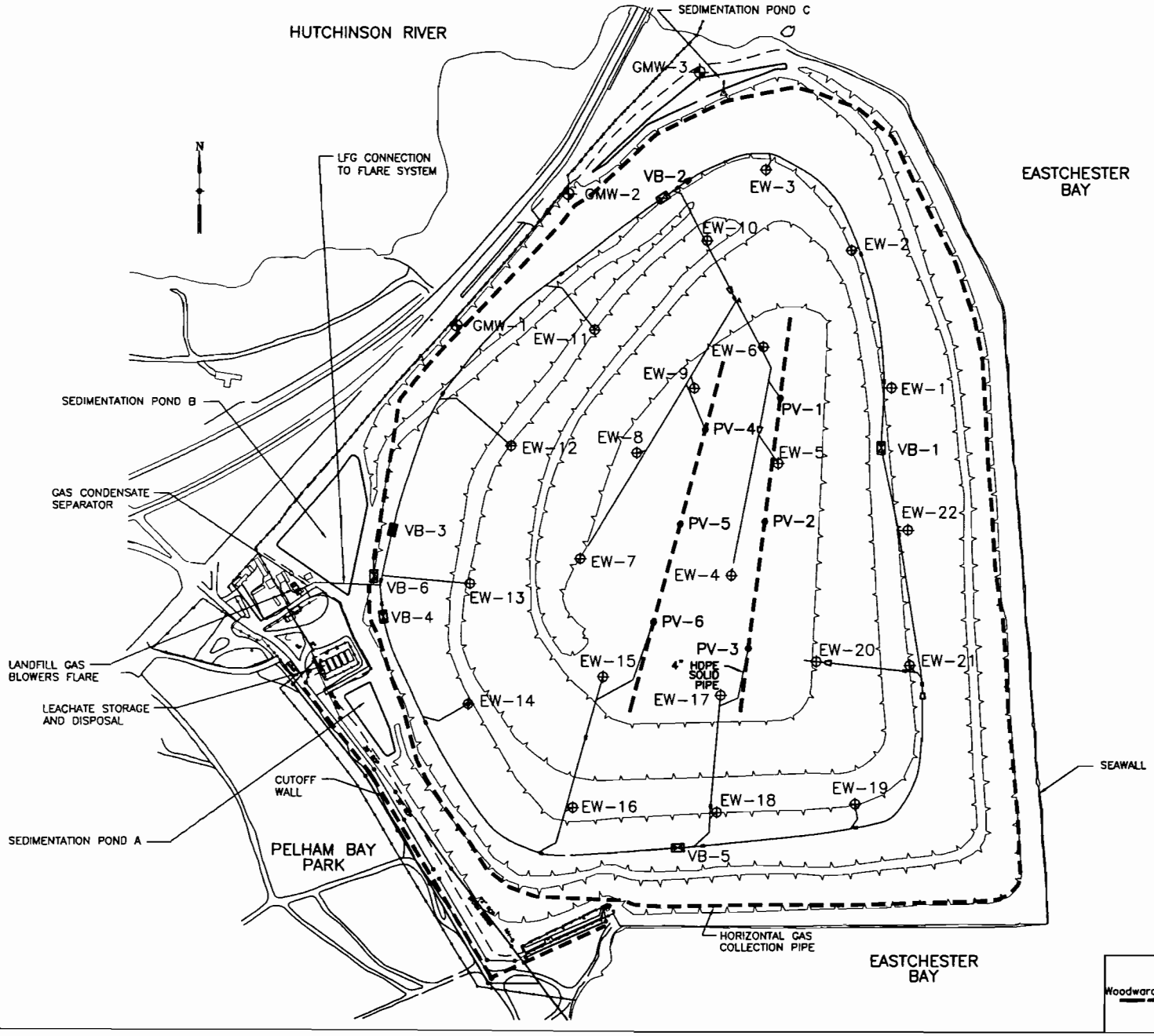


Photo No. 16. Construction of Topsoil Layer. (May 20, 1998)

APPENDIX G
FIGURES



LEGEND:

- EW-1 GAS EXTRACTION WELL
- GMW-1 GAS MONITORING WELL
- EMBANKMENT
- VB-1 VALVE BOX
- HORIZONTAL GAS COLLECTION PIPE
- PV-1 PASSIVE VENT
- LIMIT OF LANDFILL CAPPING SYSTEM
- SEAWALL
- CUTOFF WALL

DEP
THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

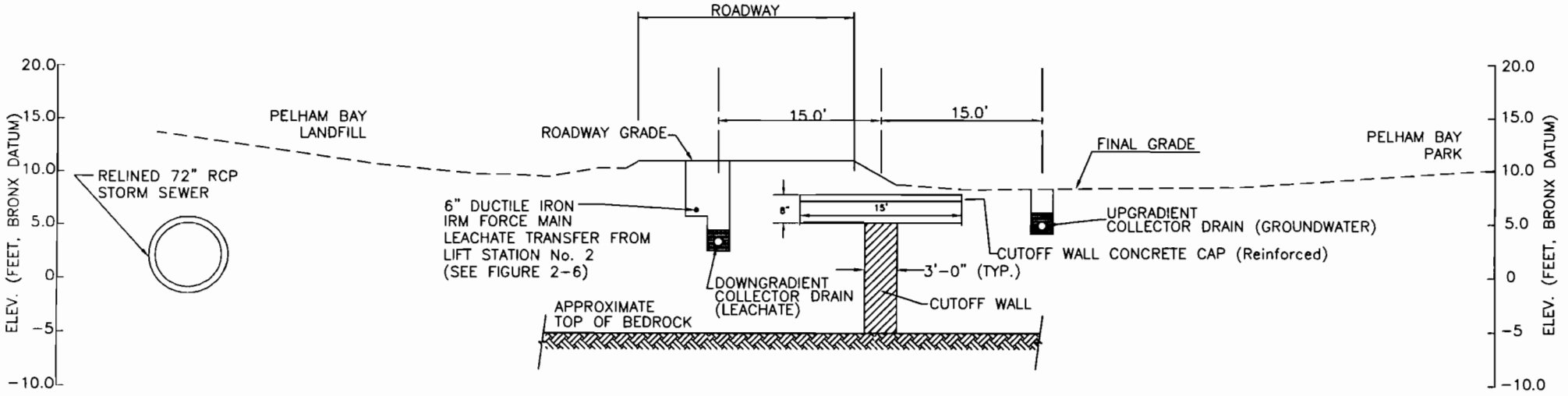
PELHAM BAY LANDFILL REMEDIATION

FIGURE G-1
GAS COLLECTION AND FLARING SYSTEM

Woodward-Clyde Consultants, Inc.

1" = 300'

AUG 1, 1996



NOTE: SEE CONTRACT HP-875 AS-BUILTS FOR LOCATION OF ELECTRICAL CONDUITS

SECTION A-A'

(NOT TO SCALE)

0 5 10 20

SCALE (FEET)

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL RECREATION

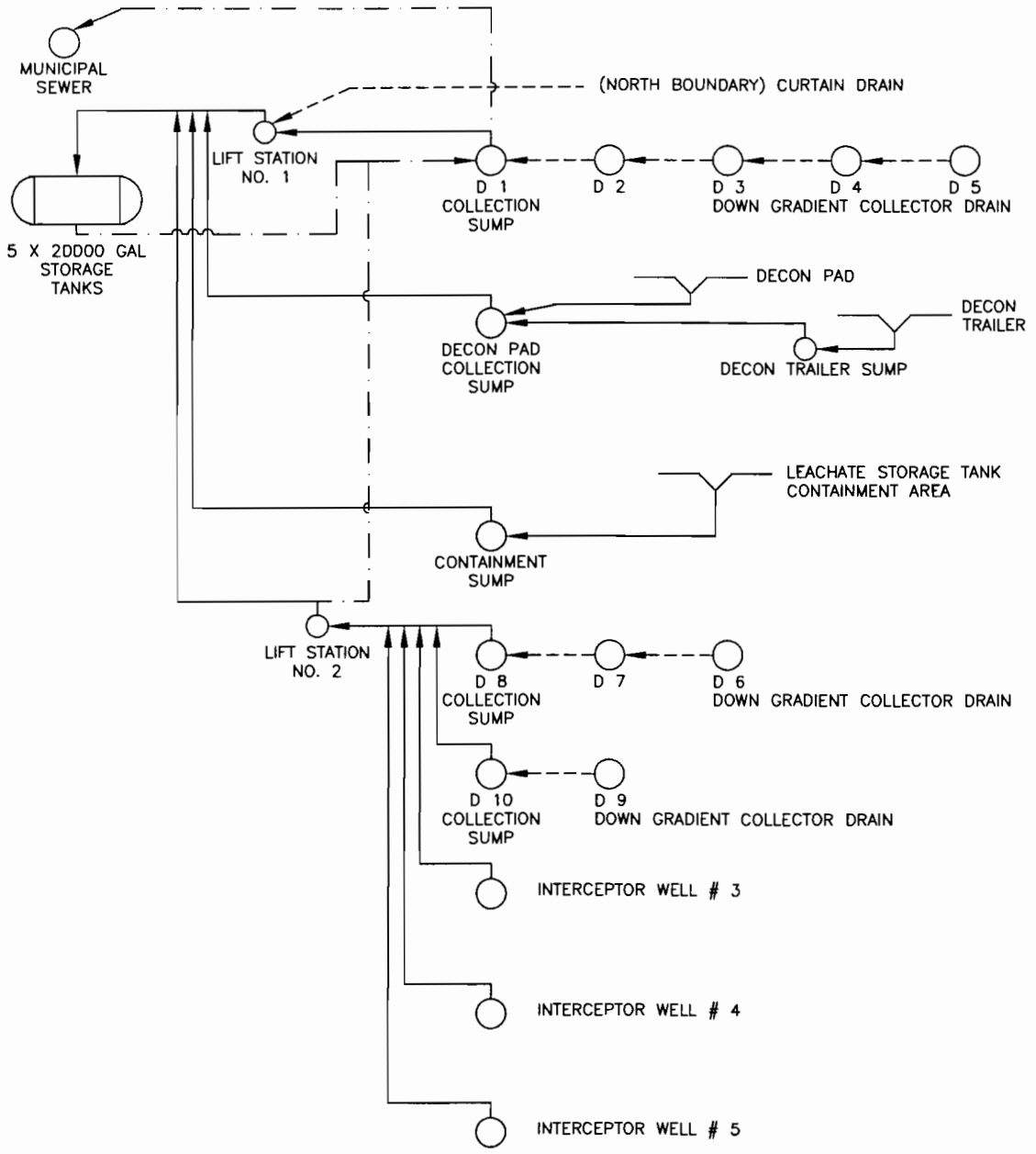
CONTRACT NO. HP-

FIGURE G-2
TYPICAL SECTION THROUGH CUTOFF WALL

Woodward-Clyde Consultants, Inc.

AS SHOWN

AUG 1, 1996



LEGEND

- PIPED DISCHARGE TO WET WELL
- DRAIN DISCHARGE TO WET WELL
- PUMPED DISCHARGE FROM WET WELL
- FUTURE PIPEWORK (CONTRACT 877HP)

DEP
THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

NO	DATE	DESCRIPTION	APPR'D

REVISIONS

CAPITAL PROJECT NAME & NO.: PELHAM BAY LANDFILL REMEDIATION

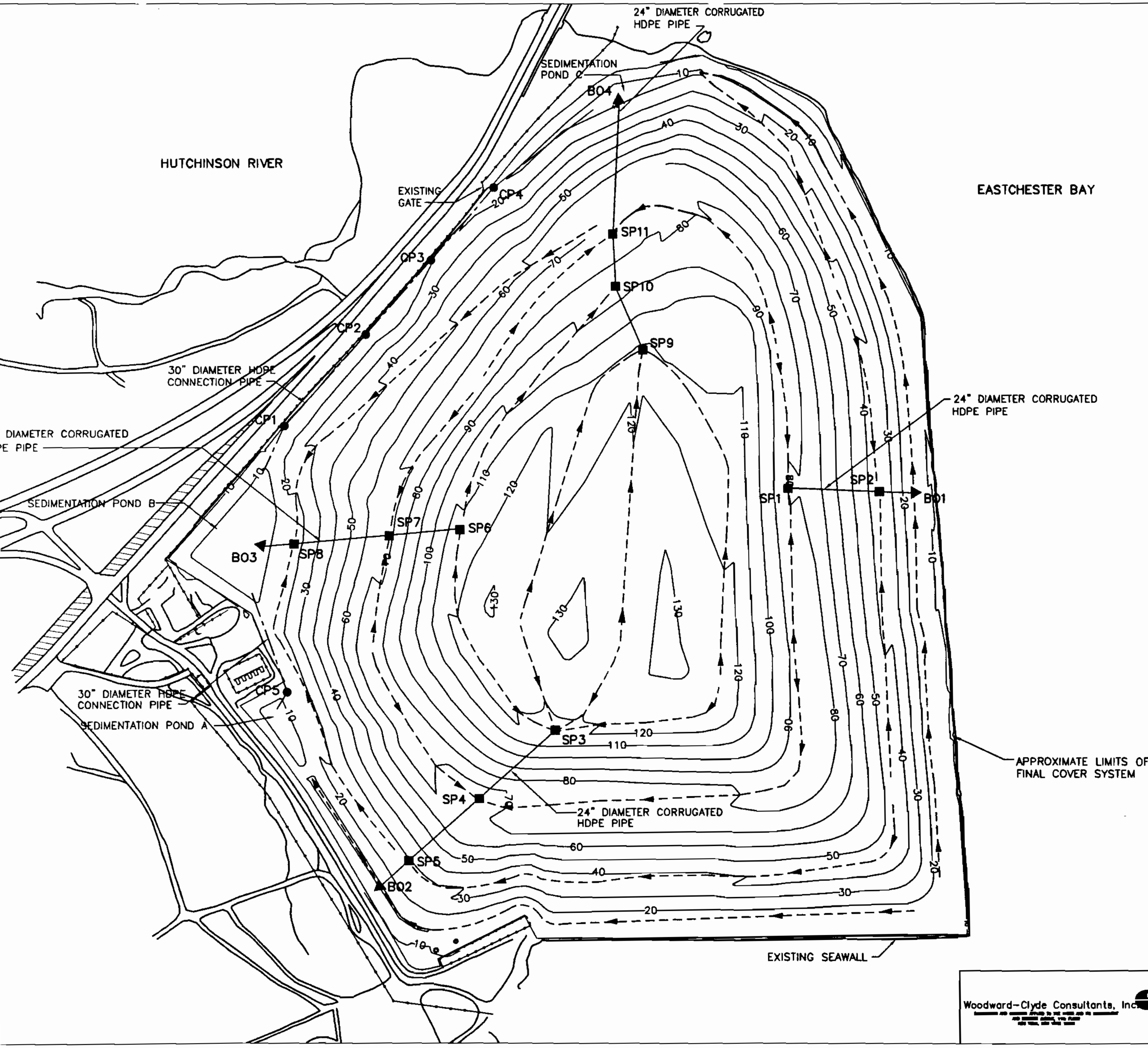
CONTRACT NAME & NO.: GEOMEMBRANE CAPPING AND GAS COLLECTION SYSTEM CONTRACT NO. 876-HP

DRAWING TITLE:

FIGURE G-3
LEACHATE COLLECTION SYSTEM SCHEMATIC DIAGRAM

Woodward-Clyde Consultants, Inc.
ENGINEERING AND SCIENCES APPLIED TO THE EARTH AND ITS ENVIRONMENT
343 SEVENTH AVENUE, 11th FLOOR
NEW YORK, NEW YORK 10001

DESIGNED BY: RMT	DIVISION CHIEF:
DRAWN BY: KAK	PROJ MGR:
CHECKED BY: RMT	GRAPHIC SCALE:
GROUP LEADER:	SCALE: NOT TO SCALE
	DWG. NO.:
	SHEET NO.
	DATE:
	OF:



LEGEND:

SP1 ■	HDPE COMBINATION STORMWATER COLLECTION MANHOLE/INLET
B01 ▲	BAFFLED OUTLET
CP1 ●	HDPE SEDIMENTATION POND CONNECTION MANHOLE
— ◄ —	STORMWATER DRAINAGE DITCH SHOWING DIRECTION OF FLOW
——	24" DIAMETER CORRUGATED HDPE PIPE
— · —	HDPE SEDIMENTATION POND CONNECTION PIPE
HDPE	HIGH DENSITY POLYETHYLENE

DEP

THE CITY OF NEW YORK
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BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL REMEDIATION

CONTRACT NO. 879-HP

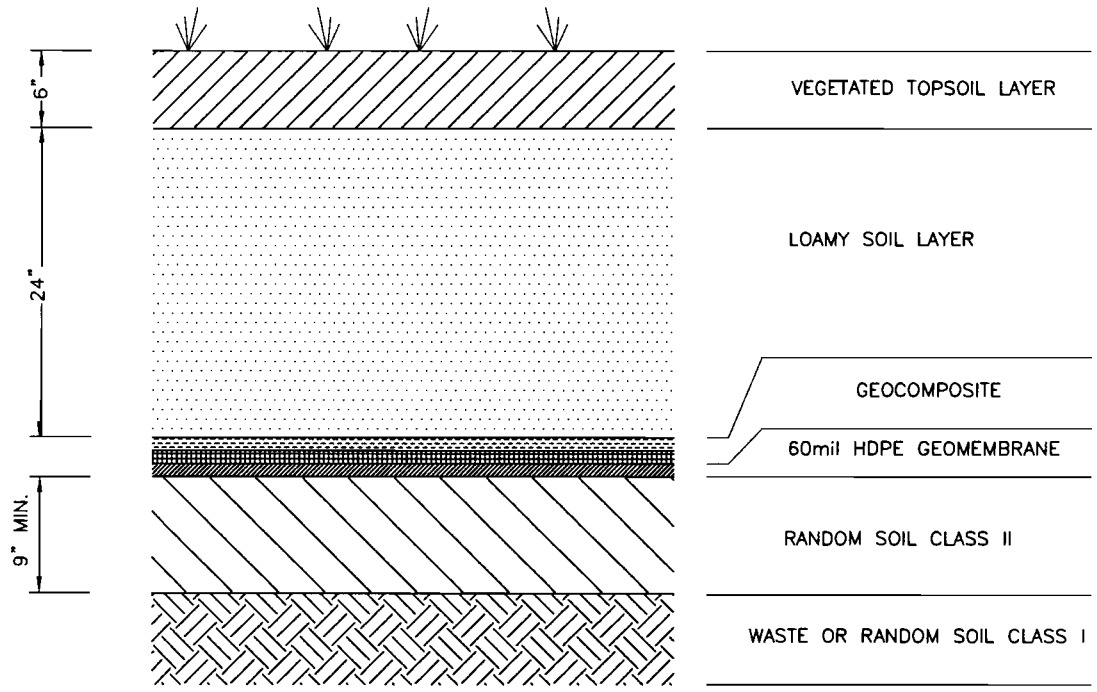
FIGURE G-4
STORMWATER MANAGEMENT SYSTEM

Woodward-Clyde Consultants, Inc.

DESIGNED BY: JBS
DRAWN BY: PFL
CHECKED BY: DJH
GROUP LEADER: AJC

SCALE: 1" = 100'
DATE: JULY 13, 1994

C.9 10
C.19 28



TYPICAL COVER SECTION

NOT TO SCALE

THE CITY OF NEW YORK
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REVISIONS

PELHAM BAY LANDFILL REMEDIATION

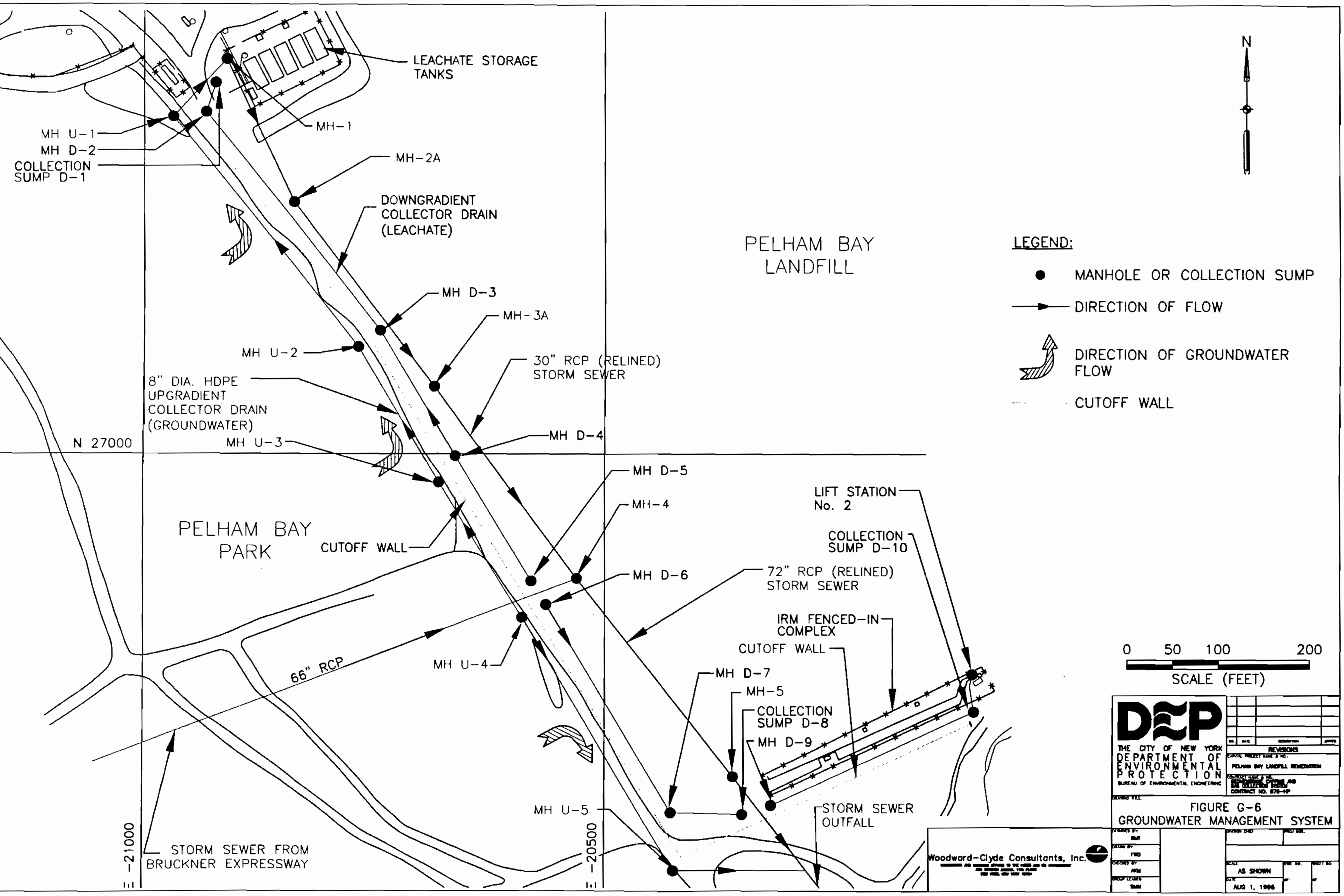
RECOLLECTION SYSTEM AND GAS COLLECTION SYSTEM
CONTRACT NO. 876-HP

FIGURE G-5
TYPICAL LANDFILL COVER SECTION

Woodward-Clyde Consultants, Inc.

DESIGNED BY: WLP
DRAWN BY: WLP
CHECKED BY: BJH
GROUP LEADER: AJC

SCALE: AS NOTED
DATE: JULY 13, 1994
DWG. NO.: C.9
SHEET NO.: 9 OF 36


LEACHATE STORAGE TANKS
MH-1
MH U-1
MH D-2
COLLECTION SUMP D-1
MH-2A
DOWNGRADIENT COLLECTOR DRAIN (LEACHATE)
PELHAM BAY LANDFILL
MH D-3
MH-3A
MH U-2
30" RCP (RELINED) STORM SEWER
8" DIA. HDPE UPGRADIENT COLLECTOR DRAIN (GROUNDWATER)
N 27000
MH U-3
MH D-4
MH D-5
MH-4
PELHAM BAY PARK
CUTOFF WALL
MH D-6
72" RCP (RELINED) STORM SEWER
LIFT STATION No. 2
COLLECTION SUMP D-10
IRM FENCED-IN COMPLEX
CUTOFF WALL
66" RCP
MH U-4
MH D-7
MH-5
COLLECTION SUMP D-8
MH D-9
MH U-5
STORM SEWER OUTFALL
-21000
-20500
STORM SEWER FROM BRUCKNER EXPRESSWAY
N
LEGEND:
MANHOLE OR COLLECTION SUMP
DIRECTION OF FLOW
DIRECTION OF GROUNDWATER FLOW
CUTOFF WALL
0 50 100 200
SCALE (FEET)
DEP
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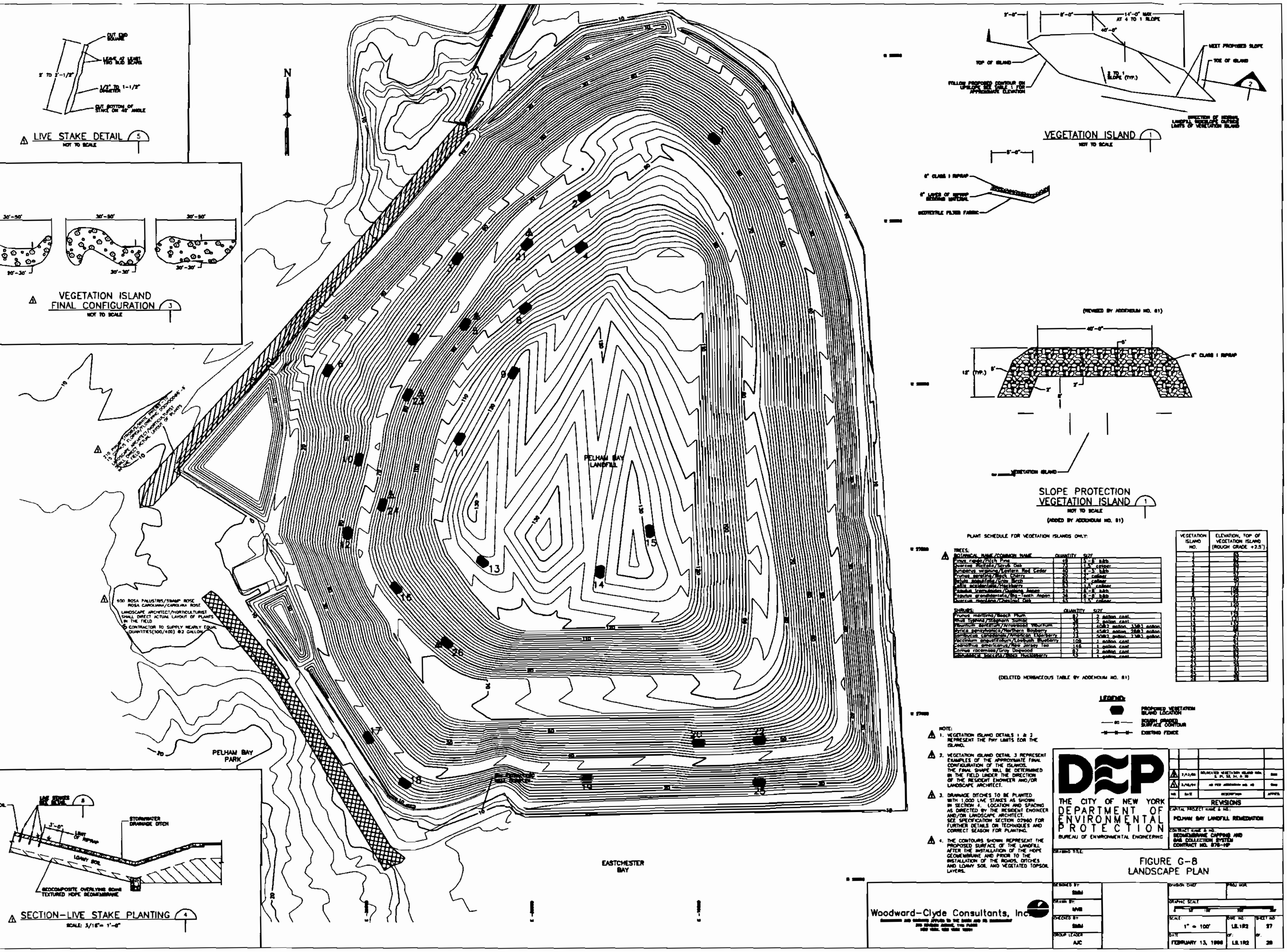
REVISIONS
FIGURE G-6
GROUNDWATER MANAGEMENT SYSTEM
AS SHOWN
AUG 1, 1996
Woodward-Clyde Consultants, Inc.



PLANT SCHEDULE FOR VEGETATION ISLANDS ONLY:

TREES:

BOTANICAL NAME/COMMON NAME	QUANTITY	SIZE
Pinus rigida/Pitch Pine	49	5'-6' b&b
Quercus ilicifolia/Scrub Oak	73	1.5" caliper
Juniperus virginiana/Eastern Red Cedar	40	4'-5' b&b
Prunus serotina/Black Cherry	20	2" caliper
Betula populifolia/Gray Birch	85	2" caliper
Celtis occidentalis/Hackberry	53	1.5" caliper
Populus tremuloides/Quaking Aspen	24	6'-8' b&b
Populus grandidentata/Big-Tooth Aspen	36	6'-8' b&b
Quercus montana/Chestnut Oak	45	1.5" caliper

SHRUBS:

	QUANTITY	SIZE
Prunus maritima/Beach Plum	87	2 gallon cont.
Rhus typhina/Staghorn Sumac	36	2 gallon cont.
Viburnum dentatum/Arrowwood Viburnum	73	40@2 gallon, 33@3 gallon
Myrica pensylvanica/Northern Bayberry	73	45@2 gallon, 28@3 gallon
Sambucus canadensis/American Elderberry	73	50@2 gallon, 23@3 gallon
Vaccinium angustifolium/Lowbush Blueberry	109	1 gallon cont.
Ceanothus americanus/New Jersey Tea	146	1 gallon cont.
Cornus racemosa/Gray Dogwood	87	2 gallon cont.
Gaylussacia baccata/Black Huckleberry	57	1 gallon cont.

(DELETED HERBACEOUS TABLE BY ADDENDUM NO. 81)

VEGETATION ISLAND NO.	ELEVATION, TOP OF VEGETATION ISLAND (ROUGH GRADE +2.5')
[illegible]	[illegible]

NOTE:

1. VEGETATION ISLAND DETAILS 1 & 2 REPRESENT THE PAY LIMITS FOR THE ISLAND.
2. VEGETATION ISLAND DETAIL 3 REPRESENT EXAMPLES OF THE APPROXIMATE FINAL CONFIGURATION OF THE ISLANDS. THE FINAL SHAPE WILL BE DETERMINED IN THE FIELD UNDER THE DIRECTION OF THE RESIDENT ENGINEER AND/OR LANDSCAPE ARCHITECT.
3. DRAINAGE DITCHES TO BE PLANTED WITH 1,000 LIVE STAKES AS SHOWN IN SECTION 4. LOCATION AND SPACING AS DIRECTED BY THE RESIDENT ENGINEER AND/OR LANDSCAPE ARCHITECT. SEE SPECIFICATION SECTION 02960 FOR FURTHER DETAILS ON TECHNIQUES AND CORRECT SEASON FOR PLANTING.
4. THE CONTOURS SHOWN REPRESENT THE PROPOSED SURFACE OF THE LANDFILL AFTER THE INSTALLATION OF THE HDPE GEOMEMBRANE AND PRIOR TO THE INSTALLATION OF THE ROADS, DITCHES AND LOAMY SOIL AND VEGETATED TOPSOIL LAYERS.

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REVISIONS

CAPITAL PROJECT NAME & NO.: PELHAM BAY LANDFILL REMEDIATION

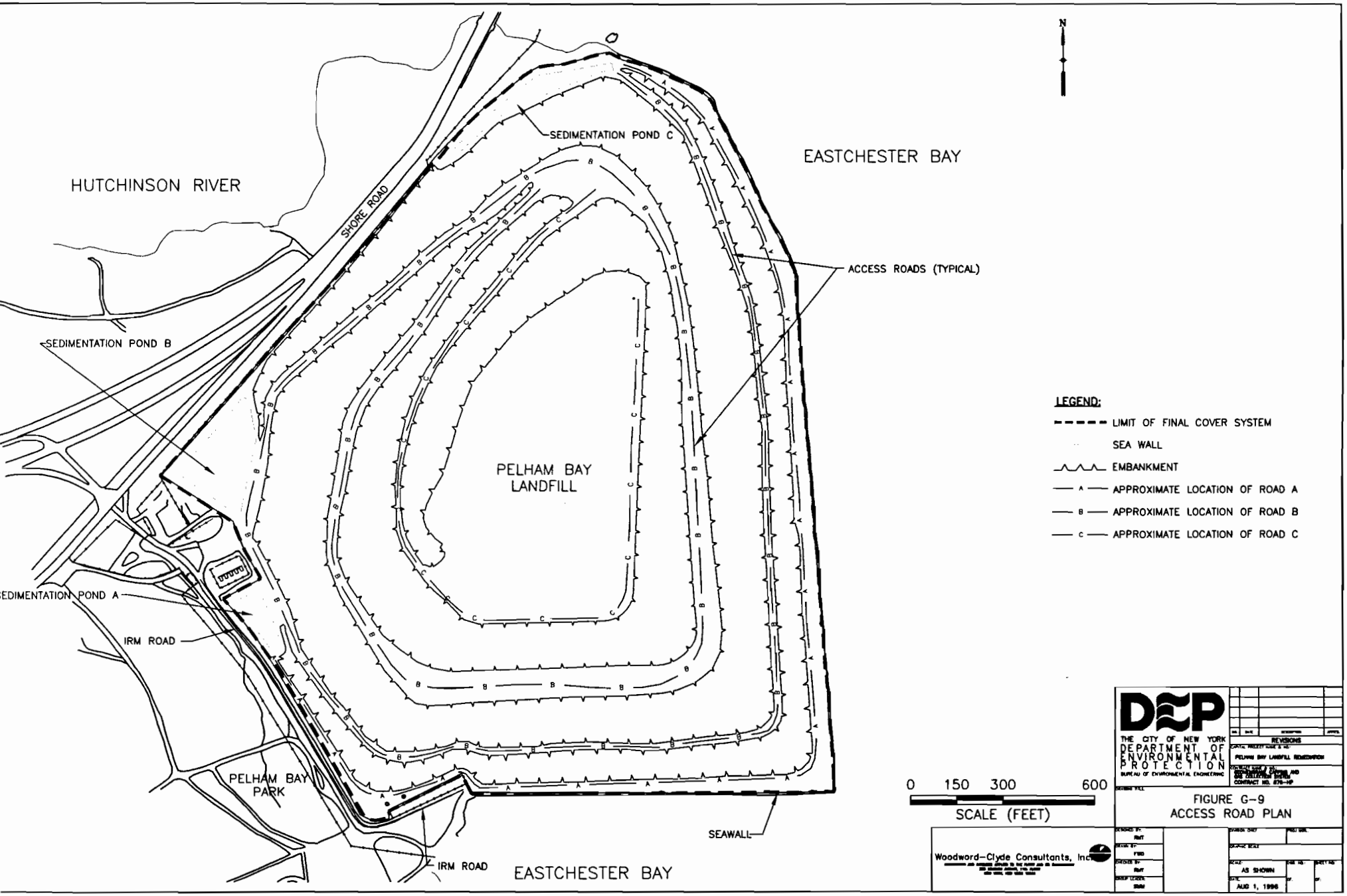
CONTRACT NAME & NO.: GEOMEMBRANE CAPPING AND GAS COLLECTION SYSTEM CONTRACT NO. 876-HP

DRAWING TITLE:

FIGURE G-8
LANDSCAPE PLAN

SCALE: 1" = 100'

DATE: FEBRUARY 13, 1996



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PELHAM BAY LANDFILL REMEDIATION

CONTRACT NO. 878-HP

FIGURE G-9
ACCESS ROAD PLAN

Woodward-Clyde Consultants, Inc.

AS SHOWN

AUG 1, 1996

Damage to the Liner

The Problem

High winds started on Friday, February 26, 1996, forcing a halt to all construction activities on the landfill. At the time we were in the process of installing geo-composite material and Barrier Protection Layer (BPL) on the geomembrane previously installed on the top of the landfill.

Since the wind exceeded 40mph at the base of the landfill no one was allowed to travel to the top where the wind was usually 10-15MPH higher and the potential for injury greater.

The high wind condition continued for the weekend and subsided by Monday March 1st On Monday afternoon the crew ventured back on the landfill to investigate the extent of the damage the weekend storm has caused to the liner. At the top of the landfill it was revealed that approximately 13:5 acres of lining on the top was damaged.

Of the damaged areas approximately 10 acres were completely missing as it had blown off the top and was at the base or in the surrounding water or park. The nature of the damage to the liner that was left on the top was stretching in areas and shrinking in others.

Damage

Based on the condition of the damaged areas two theories emerged as the main cause of the damage: wind or fire.

The idea of a fire would seem to be remote at best, as conditions on the top of the landfill at that time would not be conducive to a fire. On the one hand, the conditions of high winds with little or no gas accumulation would make a fire unlikely. On the other hand, there could have been accumulation of landfill gas below the liner in the gas collection layer. This landfill gas could have been directed upward and accumulated below the liner on the landfill "plateau". However the shrinking and fusing of large portions of the line gave credence to the theory.

The second and more plausible theory is that of extensive wind damage. It is possible that the high winds at the top of the landfill reached over 70mph and caused excessive stretching of the liner. As the liner broke and flapped in the wind it stretched and then fused as it lost its elasticity.

Neither theory was extensively researched and the focus soon returned to repairing the damaged areas and the closure of the landfill.

The contractor made a claim to his insurance company and the insurance company of the liner installation subcontractors. A settlement was reached by all parties and the liner replacement started.

Replacing the Damaged Liner

Extensive testing on the liner that remained was conducted to set the limits of the damaged areas. Portions of the liner were removed and tested on site and samples were sent to the lab for conformation. All the liner that exhibited any result that did not meet the requirement of the contract was removed and new liner was installed.

Appendix B-6 and B-7 shows the QC testing results

New liner was installed in the spring and the liner was completed by the summer of 1996.

Section 6.5 Landscaping

In the fall of 1995 the contractor started to stock pile topsoil at the base of the landfill in anticipation of spreading the soil during the winter and start the final planting in the spring of 1996.

The contracts called for spreading 6"of topsoil over 2 feet of barrier protection layer and landscaping the soil with a design seed mix of prairie grass and other wild grasses. The seed mix was specially designed for the landfill and was purchased and stored at a seed depot.

Topsoil

The contractor investigated and submitted various sources that were going to be used proposed to provide the quantity and quality of topsoil to be used on the landfill. However due to the large volume and the quality required, the required material could not be obtained naturally and would have to be manufactured from soil and compost.

Soil delivery:
The contract required the topsoil testing @ 1 sample per source. As the possible sources increased and quality of the material decreased additional soil testing was required. A change order was issued to the contractor for additional testing at the source and at the site.

After soil testing at the various processing sites two subcontractors were eventually approved to deliver material to the site for use as topsoil. The two approved subcontractors delivered approximately 20,000 cubic yards of topsoil that was stockpiled at the base of the landfill. The material was tested at the source and at the landfill and the data in the resulting test report was in compliance with the contract and was submitted to the New York City DEP.

Soil Spreading and planting
Spreading of the topsoil started on the east side of the landfill in February of 1996. Starting on the lower level of the landfill 6" of topsoil was spread by bulldozers. After approximately 30 acres were covered with topsoil the area was hydro-seeded with the design seed mix and a rye grass seed mix.

Landscaping
The hydro-seeding operation consists of mixing the specified prairie seed with a rye grass and sheep fescue seeds, water and green coagulant indicator. The rye grass and fescue was used as a quick germinating grass that would provide shade for the prairie seed during the initial germination period. During April and May of 1996 the lower area of the landfill was hydro-seeded with the mix and the area covered with straw mulch for shade and moisture retention.

Initial Growth

In June and July of 1996 the specified prairie grass or the rye grass did not germinate as expected. It was initially believed that this was due to the hot summer days in June and July and the seeds would germinate as the heat subsides. The soil and the seeded areas were inspected by personnel from the New York City Parks Department, the landscaper and Cornell Cooperation extension to ascertain the reason why the grass was not germinating as anticipated. The results from the testing and inspection showed no adverse conditions that would prevent the specified seed mix from growing.

By September 1996 the grass did not show any improvement and additional testing and consultations with Cornell and Parks Department, revealed that the pH was above the acceptable limit for the specified prairie grass mix.

Investigation

The DEP and DEC commissioned Rutgers University as an outside source to investigate the problem with the lack of growth in the area previous landscaped. The focus of the investigation was on soil source, seed stock and planting technique.

Additional investigation was conducted by the NYC IG, NYS DEC and the court appointed Special Referee Office to see if any malfeasance was involved.

Soil: After additional testing on landfill, at the source and in the stockpile, it was determined that the soil was of low quality and had a high pH which would prevent the grass from growing.
The investigators reviewed the test results from the contractors approved lab and found inaccuracies with the data and poor QA/AC for the lab. The lab was dismissed and a new lab was contracted to do all further soil testing.

Soil Source: One of the approved sources for the topsoil to the site manufactured the topsoil from a blend of compost and dirt and stockpiled the material next to a recycling area. The investigation revealed that the recycled material along with other unspecified material was added to the topsoil blend as a bulking agent. These material consisting of wood, crushed concrete, glass and other crushed material.

Seed Stock: Testing of the seed that was purchased and stored for use on the landfill revealed germination rates below normal. The germination rates for the stock material were less than the specified rate. New seeds would therefore be required.

Planting Technique: The planting schedule and technique of the subcontractor were reviewed and found to be substandard and a new sub-contractor was hired to complete the project.

The investigation by the NYC DEP IG and the Federal Special Referee revealed that there was no malfeasance by City or State employees and the problem was contractual

between Brecco the contractor and their sub-contractors for the soil, seed and landscaping.

New Landscaping

The result of the investigation resulted in new techniques for planting and a new protocol for soil testing and delivery to the site.

The recommendation of the investigation was:

(1) The existing soil at the site both topsoil and the soil for the barrier protection layer was to be treated with sulfur to reduce the pH

(2) The entire landfill (including the areas previous topsoiled) was to be covered with 6 inches of new topsoil.

(3) New seeds were to be used

(4) A new and more experienced landscaper was to be hired.

With a new testing protocol featuring additional soil testing and more frequent site visits, new topsoil was manufactured and delivered to the site.

Sulfur was added to the existing soil and mixed to lower the pH of the existing soil. After mixing and testing the pH of the soil was lowered and the new topsoil was spread over the existing soil.

During the spring and fall of 1999 the landfill was landscaped using new soil, new seed and a new landscaper.

The new soil was hydroseeded and straw mulch was used to cover the seeds for protection from the sun and also as a moisture retention barrier.

Growth on the landfill was established by the summer of 2000 and deemed to be successful by the spring of 2001.