Permit Modification No. 7

IESI TIMBERLANE LANDFILL

D-003-8646 / P-0339
AI No. 52277

Oakdale, Louisiana

September 2007

SIGMA
ENGINEERS &
CONSTRUCTORS, INC.

10305 Airline Highway
Baton Rouge, Louisiana 70816

GRSA-SIGMA
CONSULTANTS AND ENGINEERS

Daniel B. Kais, P.E, *President*
D. Todd Drummond, P.E., *Vice President*
Stephen J. Brasuell, P.E., *Director*

Gary W. Cadby, *Chief Executive Officer*
Corey E. Sullivan, *Vice President*
Michael N. Dooley, M.B.A., P.E., *Director*

MAIN FILE

original to IOSW
copy to SW/G3/Thomas
AVG

PER20070001

2007 SEP 19 PM 2 56
LDEQ RECEIPT

September 19, 2007

Mr. Bijan Sharafkhani, P.E.
Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box 4313
Baton Rouge, LA 70821-4313

Subject: Request for Final Copies
Modification No. 7
IESI Timberlane Landfill
D-003-8646 P-0339 / AI 52277
Oakdale, Louisiana (PER20060001)

Dear Mr. Sharafkhani:

Sigma Engineers and Constructor's (SEC), on behalf of IESI LA Landfill Corporation, is respectfully submitting six (6) final copies of modification no. 7 as requested.

If you have any questions concerning this submittal please contact Mr. Dale Steib, P.E. at (225) 298-0800 or Mr. Mike Friesen (817) 632-4246.

Very truly yours,

SIGMA ENGINEERS AND CONSTRUCTORS, INC.

Dale L. Steib, P.E.

C: Mike Friesen, IESI Corp.
Marvin Kelch, IESI Timberlane Landfill

Attachments

RECEIVED
SEP 20 2007
LDEQ

10305 Airline Highway • Baton Rouge, LA 70816
Phone (225) 291-9988 • Fax (225) 298-0255

12056 Justice Avenue • Baton Rouge, LA 70816
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Web Page: www.grsa-sigma.com

Permit Modification No. 7

IESI Timberlane Landfill

D-003-8646 / P-0339
AI No. 52277

Oakdale, Louisiana

September 2007

RECEIVED
SEP 20 2007
LDEQ

PART II

LDEQ-EDMS Document 36287415, Page 5 of 132

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application modification and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

DALE L. STEIB, P.E.
LA. REG. NO. 28229

STATE OF LOUISIANA
DALE L. STEIB
License No. 28229
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

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LAC 33:VII.521.F.3.a.

3. The following information on plans and specifications is required for Type I, II, and III landfills:

a. approximate dimensions of daily fill and cover; and

RESPONSE:

Timberlane Landfill will utilize silty clays and sandy clays for daily cover ***as well as any other LDEQ approved material.*** As each day's disposal area approaches final grades, daily cover will be applied so that at the end of the work day, all waste has a minimum of six (6") inches of soil cover ***or is covered by the manufactures recommended thickness of an LDEQ approved Material.*** After the landfill has been in operation and the disposal areas are well defined, a portable synthetic cover such as tarps or plastic sheets may ***also*** be utilized as a substitute for daily cover. However, if synthetic covers are used under no conditions shall waste go more than three (3) days without a 6" soil cover being placed. An interim cover (12 inches) or interim compacted cover (24 inches) composed of similar soil types as the daily cover will be applied in lifts of six (6") inches compacted thickness within 48 hours of the last receipt of solid waste in an operating area and on all operating areas not receiving solid waste for a period longer than 60 days.

The exact width and depth of the daily cover applied will vary according to the amount of waste received each particular day. However, ideal depth varies between 10 and 15 feet with a standard disposal area width between 100 and 150 feet.

The installation of daily and interim cover at the facility will help to minimize vector-breeding and animal attraction, control leachate generation, reduce fire-hazard potential, minimize blowing paper and litter, reduce noxious odors, provide an aesthetic appearance and allow accessibility regardless of weather.

Alternate forms of daily cover may be used including but not limited to hydro mulching such as "waste-Cover" and "Posi-Shell". The specifications, MSDS sheet and operational plans for these hydro mulching products are given in Appendix 45. These materials satisfy all the requirements specified in accordance with LAC 711.B.2.a as reflected in the manufacturers published documentation. Another application of hydro mulch, or another LDEQ approved material or 6" of soil will be applied to areas that will not receive waste for more than seven days.

The approved alternate daily cover manufacturers' operation plan and/or application procedures will be followed.

LAC 33:VII.521.F.4.c.

c. a description of the leachate collection and removal system, which shall include calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings.

RESPONSE:

Timberlane Landfill will implement a leachate system which collects and treats leachate generated at the site. The leachate collection system will utilize a pipe network strategically placed on top of the disposal area's composite liner system. This pipe network will consist of a series of 6 inch perforated pipes running parallel to each other in collection trenches with a maximum overland flow distance of 100 feet (See Exhibit 9 for plans and Exhibits 13 - 16 for details). The collection trenches will be ~~24 inches wide by 10 inches deep,~~shaped in the form of a "V" and filled with gravel and wrapped by a geotextile fabric in ~~contact with the walls of the trench~~ and double lapped across the top. (See detail on Exhibit 13)

Leachate from the disposal area will migrate through a 12 inch leachate collection layer of granular matter having a permeability of $1x10^{-2}$ cm/sec or a geonet drainage layer overlain by a 12" protective cover material with the minimum permeability of $1x10^{-4}$ cm/sec located on top of the disposal area's composite liner. From that point, the collected leachate will travel towards the perimeter of the disposal area, via leachate collection pipes at a minimum 1% slope to collection sumps.

LAC 33:VII.521.J.1.a.

J. Facility Closure. Standards governing facility closure are contained in LAC 33:VII.711.E (Type I and II landfills), LAC 33:VII.713.E (Type I and II surface impoundments), LAC 33:VII.715.E (Type I and II landfarms), LAC 33:VII.717.I (Type I-A and II-A facilities), LAC 33:VII.721.D (construction and demolition debris and woodwaste landfills), LAC 33:VII.723.D (Type III composting facilities), and LAC 33:VII.725.D (Type III separation facilities)

1. The closure plan for all facilities must include the following:

a. the date of final closure;

RESPONSE:

The acceptance of solid waste at Timberlane Landfill began in August 2003. Based on estimated waste volumes of 50,000 cubic gate yards a month with an annual increase of ~~approximately~~ approximately 5~~3~~%, the date of final closure for Area I of the facility is projected to be in the year of ~~2013~~2021, which translates into ~~11~~ 17 years of life.(See Appendix 44)

Available air space volumes at the facility were derived from the information found in Appendix No. 35 and are estimated at approximately ~~9.06~~ 9.45 million cubic yards in place. Landfill life calculations were based on the estimated average monthly waste volume received at the facility of 50,000 cubic gate yards with a ~~3~~5% growth factor and a compaction factor of 2.

At least 90 days prior to the closure, sealing or abandonment of any unit at the facility, written notification will be given to the administrative authority indicating the date of planned closure, changes requested in the approved closure plan, closure schedule or estimated cost.

LAC 33:VII.521.J.2.a.

2. The closure plan for Type I and II landfills and surface impoundments must include:

a. a description of the final cover and the methods and procedures used to install the cover;

RESPONSE:

After final machine compacting and grading have occurred and a disposal area is ready for closure, a final cap will be installed. This final cap will consist of 24 inches of recompacted clay with a permeability of less than 1×10^{-7} cm/sec~~, a 40 mil FML~~ and topped with a minimum of 6 inches of top soil capable of supporting vegetation. This final cap will be installed in accordance with the Minimum Quality Control/Assurance Procedures for Clay Bottom and Cap Liner Installation found in Appendix No. 31, Construction Quality Assurance for Synthetic Bottom and Cap Liner Installation found in Appendix No. 32, and minimum Construction Quality Assurance Procedures for Top Soil installation found in Appendix No. 25. ~~Prior to installation of the 40 mil FML and the top soil, the gas collection system will be installed.~~ ***Currently there are no slopes less steep than a 4:1 with the current permitted design but if there are any slopes less steep than 4:1 at closure then a HDPE layer will be included on those slopes. 180 days prior to closure IESI will submit a revised closure plan which will reflect the required changes needed if any.***

The 1% slopes at the stormwater diversion berms will incorporate an HDPE liner at the path of water conveyance. (see exhibit 15, for detail)

LAC 33:VII.521.J.2.c.

c. an estimate of the maximum inventory of solid waste ever on-site over the active life of the facility; and

RESPONSE:

Waste will be disposed of on a daily basis, thus no waste will be stored at Timberlane Landfill. The estimated volume of waste to be disposed of is ~~9.06~~9.45 million cubic yards of in place waste. Using a compaction factor of 2.0 results in approximately ~~18.12~~18.90 million cubic yards of gate volume.

LAC 33:VII.521.J.2.d.

d. a schedule for completing all activities necessary for closure.

RESPONSE:

It is anticipated that Area I of the Timberlane Landfill will have an anticipated life of ~~13~~ 17 years. Assuming that no additional expansion is approved, closure of the landfill would begin approximately ~~13~~–17 years after the initial operation of the facility. Construction of the final phase of the gas collection system, synthetic cap and recompacted clay liner for the landfill should take one calendar year from last receipt of waste.

The post closure period will be a minimum of 30 years during which time the oxidation pond will most probably remain in use. Once the oxidation pond is no longer needed, the pond will be dewatered and clean closed. This closure will take approximately two years to complete. This date will be approximately 45 years after the landfill first received waste.

APPENDIX 35

ESTIMATED LANDFILL QUANITITIES

Timberlane Total Volume

Site Volume Table: Unadjusted

Cut cu.yds	Fill cu.yds	Net cu.yds	Method
Site: 60610 Timberlane Stratum: total permited landfill volume entire top pc layer bottom of final cover			
0	9445497	9445497	(F) Composite

Cell 1 Under Cut Area at Floor

5.2417 acres = 288,330 sq.ft x 3 ft. = 684,990 cu.ft = 25,370 cu.yds

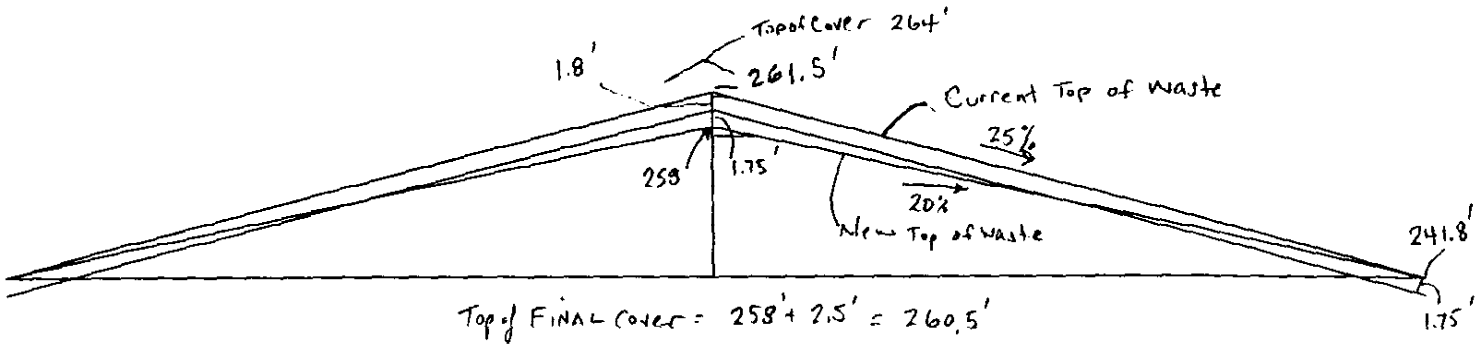
Final Cover Reduction

Based on Areas of Final cap at Elevation 241.8'

Area = 380,550 sq.ft x 1.8 ft. = 684,990 cu.ft = 25,370 cu.yds

On Final Cover every Contour at and above Elevation 241.8' is lowered by 1.8 feet. This reduces the

Final Contour Slope above elevation 241.2 from a 25% slope to a 20% Slope.



STATE OF LOUISIANA
DALE L. STEIB
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1/29/07

APPENDIX 38

HELP MODEL CALCULATIONS

TIMBNFML

WARNING: TEMPERATURE FOR YEAR 1 USED WITH PRECIPITATION FOR YEAR 1974

WARNING: SOLAR RADIATION FOR YEAR 1 USED WITH PRECIPITATION FOR YEAR 1974

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0
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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```

New Run without the FML on Top. used Same perameters for Comparison

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PRECIPITATION DATA FILE:      C:\HELPMO~1\timb.D4
TEMPERATURE DATA FILE:        C:\HELPMO~1\timb.D7
SOLAR RADIATION DATA FILE:    C:\HELPMO~1\timb.D13
EVAPOTRANSPIRATION DATA:      C:\HELPMO~1\timb.D11
SOIL AND DESIGN DATA FILE:    C:\HELPMO~1\timbnfml.D10
OUTPUT DATA FILE:             C:\HELPMO~1\timbnfml.OUT
```

TIME: 19:50 DATE: 2/22/2007

No Appricative Difference

```
******************************************************************************

     TITLE:  Timberlane Landfill 25% Final Cover Slope (No FML)

******************************************************************************
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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

```
                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER  13
          THICKNESS                  =      6.00   INCHES
          POROSITY                   =      0.4300 VOL/VOL
          FIELD CAPACITY             =      0.3210 VOL/VOL
          WILTING POINT              =      0.2210 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.3837 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.330000003000E-04 CM/SEC
       NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

TIMBNFML

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1800.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0450	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.989999995000E-02	CM/SEC
SLOPE	=	0.00	PERCENT
DRAINAGE LENGTH	=	0.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	4.00	HOLES/ACRE

TIMBNFML

FML INSTALLATION DEFECTS	=	0.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	74.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	71.000	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.302	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.580	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.326	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	554.062	INCHES
TOTAL INITIAL WATER	=	554.062	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Lake Charles LOUISIANA

MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	32	
END OF GROWING SEASON (JULIAN DATE)	=	361	
AVERAGE ANNUAL WIND SPEED	=	8.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	77.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	77.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	80.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78.00	%

NOTE: PRECIPITATION DATA FOR LAKE CHARLES LOUISIANA

WAS ENTERED FROM THE DEFAULT DATA FILE.

TIMBNFML

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SHREVEPORT LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
54.50	54.30	60.70	68.40	74.90	80.40
82.30	81.60	78.20	69.30	59.70	53.90

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR LAKE CHARLES LOUISIANA

STATION LATITUDE = 30.10 DEGREES

WARNING: TEMPERATURE FOR YEAR 1 USED WITH PRECIPITATION FOR YEAR 1974

WARNING: SOLAR RADIATION FOR YEAR 1 USED WITH PRECIPITATION FOR YEAR 1974

****

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	66.44	17123580.000	100.00
RUNOFF	40.981	10562113.000	61.68
EVAPOTRANSPIRATION	24.215	6240907.000	36.45
PERC./LEAKAGE THROUGH LAYER 2	1.243771	320557.094	1.87
AVG. HEAD ON TOP OF LAYER 2	3.2787		
DRAINAGE COLLECTED FROM LAYER 4	1.2438	320557.094	1.87
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0011		
CHANGE IN WATER STORAGE	0.000	0.000	0.00
SOIL WATER AT START OF YEAR	554.062	142798416.000	
SOIL WATER AT END OF YEAR	554.062	142798416.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.349	0.00

****

TIMBNFML

WARNING: TEMPERATURE FOR YEAR 2 USED WITH PRECIPITATION FOR YEAR 1975

WARNING: SOLAR RADIATION FOR YEAR 2 USED WITH PRECIPITATION FOR YEAR 1975

****

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.51	14306591.000	100.00
RUNOFF	27.251	7023522.000	49.09
EVAPOTRANSPIRATION	26.766	6898429.500	48.22
PERC./LEAKAGE THROUGH LAYER 2	1.316162	339214.562	2.37
AVG. HEAD ON TOP OF LAYER 2	3.1992		
DRAINAGE COLLECTED FROM LAYER 4	1.3162	339214.562	2.37
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0012		
CHANGE IN WATER STORAGE	0.176	45429.945	0.32
SOIL WATER AT START OF YEAR	554.062	142798416.000	
SOIL WATER AT END OF YEAR	554.238	142843840.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-5.008	0.00

****

WARNING: TEMPERATURE FOR YEAR 3 USED WITH PRECIPITATION FOR YEAR 1976

WARNING: SOLAR RADIATION FOR YEAR 3 USED WITH PRECIPITATION FOR YEAR 1976

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.40	10412289.000	100.00

TIMBNFML

RUNOFF	16.596	4277213.500	41.08
EVAPOTRANSPIRATION	22.746	5862396.500	56.30
PERC./LEAKAGE THROUGH LAYER 2	1.176277	303161.781	2.91
AVG. HEAD ON TOP OF LAYER 2	2.7153		
DRAINAGE COLLECTED FROM LAYER 4	1.1763	303161.812	2.91
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0011		
CHANGE IN WATER STORAGE	-0.118	-30485.885	-0.29
SOIL WATER AT START OF YEAR	554.238	142843840.000	
SOIL WATER AT END OF YEAR	554.120	142813360.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.533	0.00

****

WARNING: TEMPERATURE FOR YEAR 4 USED WITH PRECIPITATION FOR YEAR 1977

WARNING: SOLAR RADIATION FOR YEAR 4 USED WITH PRECIPITATION FOR YEAR 1977

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ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.37	14785965.000	100.00
RUNOFF	31.852	8209188.500	55.52
EVAPOTRANSPIRATION	24.150	6224097.000	42.09
PERC./LEAKAGE THROUGH LAYER 2	1.196101	308271.187	2.08
AVG. HEAD ON TOP OF LAYER 2	2.9346		
DRAINAGE COLLECTED FROM LAYER 4	1.1961	308271.156	2.08
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0011		
CHANGE IN WATER STORAGE	0.172	44407.457	0.30
SOIL WATER AT START OF YEAR	554.120	142813360.000	

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SOIL WATER AT END OF YEAR	554.292	142857776.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.737	0.00

****

WARNING: TEMPERATURE FOR YEAR 5 USED WITH PRECIPITATION FOR YEAR 1978

WARNING: SOLAR RADIATION FOR YEAR 5 USED WITH PRECIPITATION FOR YEAR 1978

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.44	10680330.000	100.00
RUNOFF	22.001	5670327.000	53.09
EVAPOTRANSPIRATION	18.669	4811652.500	45.05
PERC./LEAKAGE THROUGH LAYER 2	0.977150	251840.969	2.36
AVG. HEAD ON TOP OF LAYER 2	2.4568		
DRAINAGE COLLECTED FROM LAYER 4	0.9772	251841.000	2.36
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0009		
CHANGE IN WATER STORAGE	-0.208	-53484.008	-0.50
SOIL WATER AT START OF YEAR	554.292	142857776.000	
SOIL WATER AT END OF YEAR	554.085	142804288.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-6.529	0.00

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

TIMBNFML

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.40	2.09	2.46	3.63	4.49	5.60
	3.84	5.91	4.58	3.39	5.54	4.32
STD. DEVIATIONS	3.89	1.12	0.67	2.98	4.43	1.69
	2.20	3.64	1.17	2.12	1.48	2.76
RUNOFF						
TOTALS	4.689	0.955	0.292	1.740	2.246	2.928
	1.315	3.388	2.489	1.581	3.342	2.770
STD. DEVIATIONS	3.842	0.868	0.551	1.937	3.221	1.641
	1.574	2.869	1.396	1.301	1.302	2.870
EVAPOTRANSPIRATION						
TOTALS	1.559	1.687	1.821	2.089	1.870	2.645
	2.339	2.300	2.426	1.353	1.712	1.508
STD. DEVIATIONS	0.112	0.110	0.363	0.562	1.015	0.614
	0.732	0.941	0.266	0.806	0.410	0.170
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.1256	0.1073	0.0953	0.0919	0.0755	0.0999
	0.0857	0.0838	0.1124	0.0757	0.1059	0.1228
STD. DEVIATIONS	0.0057	0.0087	0.0150	0.0223	0.0504	0.0290
	0.0367	0.0487	0.0086	0.0399	0.0179	0.0066
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	0.1256	0.1073	0.0953	0.0919	0.0755	0.0999
	0.0857	0.0838	0.1124	0.0757	0.1059	0.1228
STD. DEVIATIONS	0.0057	0.0087	0.0150	0.0223	0.0504	0.0290
	0.0367	0.0487	0.0086	0.0399	0.0179	0.0066
PERCOLATION/LEAKAGE THROUGH LAYER 6						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 2						
AVERAGES	4.7336	3.7743	1.9098	1.8745	1.9640	2.8966
	2.3968	2.3475	3.3488	2.0169	3.5125	4.2278

TIMBNFML

STD. DEVIATIONS	1.0040	0.8335	0.3485	0.8212	1.6724	0.9114
	1.7598	1.6649	0.8385	1.3571	1.1619	1.0532

DAILY AVERAGE HEAD ACROSS LAYER 6

AVERAGES	0.0014	0.0013	0.0010	0.0010	0.0008	0.0011
	0.0009	0.0009	0.0013	0.0008	0.0012	0.0013
STD. DEVIATIONS	0.0001	0.0001	0.0002	0.0002	0.0005	0.0003
	0.0004	0.0005	0.0001	0.0004	0.0002	0.0001

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCENT
PRECIPITATION	52.23	(11.130)	13461750.0	100.00
RUNOFF	27.736	(9.3489)	7148473.00	53.102
EVAPOTRANSPIRATION	23.309	(2.9716)	6007496.00	44.626
PERCOLATION/LEAKAGE THROUGH FROM LAYER 2	1.18189	(0.12650)	304609.125	2.26278
AVERAGE HEAD ACROSS TOP OF LAYER 2	2.917	(0.340)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	1.18189	(0.12650)	304609.125	2.26278
PERCOLATION/LEAKAGE THROUGH FROM LAYER 6	0.00000	(0.00000)	0.000	0.00000
AVERAGE HEAD ACROSS TOP OF LAYER 6	0.001	(0.000)		
CHANGE IN WATER STORAGE	0.005	(0.1715)	1173.50	0.009

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0
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PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	5.88	1515452.370
RUNOFF	5.867	1512075.6200
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.004252	1095.84412
AVERAGE HEAD ACROSS LAYER 2	6.000	

TIMBNFML

DRAINAGE COLLECTED FROM LAYER 4	0.00425	1095.84412
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00000
AVERAGE HEAD ACROSS LAYER 6	0.001	
SNOW WATER	1.83	471727.1250

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4300

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.2020

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FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.3249	0.3875
2	10.2480	0.4270
3	525.6000	0.2920
4	0.5400	0.0450
5	0.0000	0.0000
6	15.3720	0.4270
SNOW WATER	0.000	

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APPENDIX NO. 38

HELP CALCULATIONS

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.04   (13 MARCH 1995)                 **
**                 DEVELOPED BY ENVIRONMENTAL LABORATORY                    **
**                   USAE WATERWAYS EXPERIMENT STATION                      **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
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```
PRECIPITATION DATA FILE:     C:\HELP3\TIMBERLN\TIMBPREC.D4
TEMPERATURE DATA FILE:       C:\HELP3\TIMBERLN\TIMBTEMP.D7
SOLAR RADIATION DATA FILE:   C:\HELP3\TIMBERLN\TIMBSOLR.D13
EVAPOTRANSPIRATION DATA:     C:\HELP3\TIMBERLN\TIMBEVAP.D11
SOIL AND DESIGN DATA FILE:   C:\HELP3\TIMBERLN\TIMBSOIL.D10
OUTPUT DATA FILE:            C:\HELP3\TIMBERLN\TIMBOUT.OUT
```

Original Run for Permit Application

```
TIME:  10:42     DATE:   1/ 8/1997
```

```
******************************************************************************

    TITLE:  TIMBERLANE LANDFILL

******************************************************************************


    NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
           COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                              LAYER  1
                              --------

                 TYPE 1 - VERTICAL PERCOLATION LAYER
                    MATERIAL TEXTURE NUMBER  13
        THICKNESS                  =      6.00   INCHES
        POROSITY                   =      0.4300 VOL/VOL
        FIELD CAPACITY             =      0.3210 VOL/VOL
        WILTING POINT              =      0.2210 VOL/VOL
        INITIAL SOIL WATER CONTENT =      0.3922 VOL/VOL
        EFFECTIVE SAT. HYD. COND.  = 0.330000003000E-04 CM/SEC
      NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
             FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.04	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	4.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	0.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 3

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1800.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 1

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0451	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC

SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 6

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	4.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	0.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 7

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	74.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	71.000	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.353	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.580	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.326	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	554.114	INCHES
TOTAL INITIAL WATER	=	554.114	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
LAKE CHARLES LOUISIANA

STATION LATITUDE	=	30.10 DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	32
END OF GROWING SEASON (JULIAN DATE)	=	361
EVAPORATIVE ZONE DEPTH	=	6.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	8.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	77.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	77.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	80.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78.00 %

NOTE: PRECIPITATION DATA FOR LAKE CHARLES LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR LAKE CHARLES LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
51.50	54.30	60.70	68.40	74.90	80.40
82.30	81.60	78.20	69.30	59.70	53.90

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR LAKE CHARLES LOUISIANA
AND STATION LATITUDE = 30.10 DEGREES

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	12.69	3.89	3.37	2.95	11.01	2.89
	1.28	5.54	3.60	4.15	7.30	7.77
RUNOFF	10.981	2.066	1.530	0.966	5.358	0.272
	0.000	1.468	1.722	2.274	4.180	5.894
EVAPOTRANSPIRATION	1.687	2.327	1.851	2.460	4.414	3.872

	1.210	3.341	2.677	0.860	2.947	2.029
PERCOLATION/LEAKAGE THROUGH	0.0012	0.0008	0.0003	0.0002	0.0003	0.0002
LAYER 3	0.0000	0.0003	0.0005	0.0002	0.0010	0.0011
LATERAL DRAINAGE COLLECTED	0.0010	0.0009	0.0007	0.0005	0.0003	0.0003
FROM LAYER 5	0.0002	0.0001	0.0004	0.0003	0.0005	0.0008
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.529	4.021	1.446	1.082	1.454	1.008
TOP OF LAYER 2	0.000	1.234	2.469	0.855	4.695	5.045
STD. DEVIATION OF DAILY	0.443	0.964	1.909	1.738	1.589	1.411
HEAD ON TOP OF LAYER 2	0.000	2.068	1.998	1.547	0.923	0.651
AVERAGE DAILY HEAD ON	0.003	0.003	0.002	0.001	0.001	0.001
TOP OF LAYER 6	0.000	0.000	0.001	0.001	0.002	0.002
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	66.44	17123580.000	100.00
RUNOFF	36.752	9472036.000	55.32
EVAPOTRANSPIRATION	29.676	7648404.000	44.67
PERC./LEAKAGE THROUGH LAYER 3	0.006049	1558.896	0.01
AVG. HEAD ON TOP OF LAYER 2	2.4031		
DRAINAGE COLLECTED FROM LAYER 5	0.0060	1555.920	0.01
PERC./LEAKAGE THROUGH LAYER 7	0.000010	2.647	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0015		
CHANGE IN WATER STORAGE	0.006	1573.059	0.01
SOIL WATER AT START OF YEAR	554.114	142811856.000	
SOIL WATER AT END OF YEAR	554.120	142813424.000	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.594	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	6.06	1.08	2.41	7.22	7.04	5.43
	6.96	5.15	5.37	2.50	4.22	2.07
RUNOFF	4.725	0.000	0.000	2.369	2.998	1.050
	1.015	1.727	3.079	0.244	2.039	0.447
EVAPOTRANSPIRATION	1.478	1.816	2.522	3.636	4.237	4.184
	5.945	4.386	2.460	1.493	2.003	1.472
PERCOLATION/LEAKAGE THROUGH	0.0011	0.0006	0.0003	0.0002	0.0004	0.0003
LAYER 3	0.0005	0.0004	0.0004	0.0004	0.0004	0.0005
LATERAL DRAINAGE COLLECTED	0.0010	0.0008	0.0006	0.0004	0.0004	0.0003
FROM LAYER 5	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.161	2.759	1.373	1.031	1.747	1.265
TOP OF LAYER 2	2.066	1.989	1.890	1.803	1.915	2.351
STD. DEVIATION OF DAILY	0.608	1.220	1.200	1.465	1.928	1.849
HEAD ON TOP OF LAYER 2	1.807	2.078	1.753	2.066	1.844	2.201
AVERAGE DAILY HEAD ON	0.003	0.003	0.002	0.001	0.001	0.001
TOP OF LAYER 6	0.001	0.001	0.001	0.001	0.001	0.001
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.51	14306591.000	100.00
RUNOFF	19.693	5075570.500	35.48
EVAPOTRANSPIRATION	35.632	9183337.000	64.19
PERC./LEAKAGE THROUGH LAYER 3	0.005424	1397.863	0.01
AVG. HEAD ON TOP OF LAYER 2	2.1124		
DRAINAGE COLLECTED FROM LAYER 5	0.0059	1514.461	0.01
PERC./LEAKAGE THROUGH LAYER 7	0.000010	2.616	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0014		
CHANGE IN WATER STORAGE	0.179	46169.285	0.32
SOIL WATER AT START OF YEAR	554.120	142813424.000	
SOIL WATER AT END OF YEAR	554.299	142859600.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-3.008	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.10	1.48	2.53	1.22	2.43	7.50
	2.72	0.77	3.26	4.51	5.16	6.72
RUNOFF	0.557	0.447	0.000	0.000	0.000	3.517
	0.000	0.000	0.000	2.139	2.797	5.274
EVAPOTRANSPIRATION	1.634	2.008	2.168	1.395	2.040	3.942
	3.473	0.687	2.342	2.301	2.304	1.628

PERCOLATION/LEAKAGE THROUGH	0.0008	0.0005	0.0002	0.0001	0.0001	0.0003
LAYER 3	0.0001	0.0000	0.0003	0.0005	0.0008	0.0011
LATERAL DRAINAGE COLLECTED	0.0006	0.0006	0.0004	0.0003	0.0002	0.0002
FROM LAYER 5	0.0002	0.0001	0.0001	0.0003	0.0005	0.0008
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	3.706	2.683	1.054	0.481	0.402	1.589
TOP OF LAYER 2	0.403	0.000	1.383	2.354	3.836	5.093
STD. DEVIATION OF DAILY	1.268	1.640	1.475	0.589	0.780	2.055
HEAD ON TOP OF LAYER 2	0.753	0.000	1.711	1.600	1.542	0.710
AVERAGE DAILY HEAD ON	0.002	0.002	0.001	0.001	0.001	0.001
TOP OF LAYER 6	0.001	0.000	0.000	0.001	0.002	0.002
STD. DEVIATION OF DAILY	0.892	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.40	10412289.000	100.00
RUNOFF	14.730	3796467.250	36.46
EVAPOTRANSPIRATION	25.920	6680420.500	64.16
PERC./LEAKAGE THROUGH LAYER 3	0.004931	1270.892	0.01
AVG. HEAD ON TOP OF LAYER 2	1.9154		
DRAINAGE COLLECTED FROM LAYER 5	0.0045	1151.795	0.01
PERC./LEAKAGE THROUGH LAYER 7	0.000008	2.172	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0011		
CHANGE IN WATER STORAGE	-0.255	-65738.141	-0.63
SOIL WATER AT START OF YEAR	554.299	142859600.000	
SOIL WATER AT END OF YEAR	554.044	142793856.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-14.237	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	4.85	1.55	2.50	6.22	1.63	6.16
	3.20	10.83	4.64	5.62	6.89	3.28
RUNOFF	2.915	0.738	0.190	3.878	0.000	4.130
	0.175	6.489	2.001	2.510	3.993	1.166
EVAPOTRANSPIRATION	1.708	1.620	1.941	3.087	1.630	1.909
	2.727	3.994	3.302	2.684	2.199	2.133
PERCOLATION/LEAKAGE THROUGH	0.0009	0.0005	0.0004	0.0003	0.0000	0.0001
LAYER 3	0.0001	0.0004	0.0008	0.0006	0.0005	0.0008
LATERAL DRAINAGE COLLECTED	0.0010	0.0008	0.0006	0.0004	0.0002	0.0001
FROM LAYER 5	0.0001	0.0002	0.0006	0.0006	0.0006	0.0007
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.353	2.554	1.680	1.369	0.060	0.706
TOP OF LAYER 2	0.463	1.996	3.880	2.850	2.467	3.658
STD. DEVIATION OF DAILY	0.969	2.000	2.021	1.627	0.156	1.652
HEAD ON TOP OF LAYER 2	1.257	1.995	1.662	1.723	1.957	1.479
AVERAGE DAILY HEAD ON	0.003	0.002	0.002	0.001	0.001	0.000
TOP OF LAYER 6	0.000	0.001	0.002	0.002	0.002	0.002
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.37	14785965.000	100.00
RUNOFF	28.182	7263454.000	49.12
EVAPOTRANSPIRATION	28.932	7456684.500	50.43
PERC./LEAKAGE THROUGH LAYER 3	0.005536	1426.863	0.01
AVG. HEAD ON TOP OF LAYER 2	2.1697		
DRAINAGE COLLECTED FROM LAYER 5	0.0058	1493.733	0.01
PERC./LEAKAGE THROUGH LAYER 7	0.000010	2.576	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0014		
CHANGE IN WATER STORAGE	0.250	64322.387	0.44
SOIL WATER AT START OF YEAR	554.044	142793856.000	
SOIL WATER AT END OF YEAR	554.294	142858176.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	7.929	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	6.28	2.45	1.48	0.52	0.34	6.00
	5.02	7.24	6.04	0.18	4.14	1.75
RUNOFF	4.842	0.865	0.003	0.000	0.000	2.643
	1.124	4.510	3.144	0.000	1.388	0.000
EVAPOTRANSPIRATION	1.653	2.129	1.416	1.028	0.340	3.356
	3.358	2.355	3.574	0.353	1.691	2.031
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.0011	0.0009	0.0002	0.0000	0.0000	0.0003
	0.0002	0.0001	0.0006	0.0000	0.0003	0.0005

LATERAL DRAINAGE COLLECTED	0.0008	0.0009	0.0007	0.0004	0.0001	0.0002
FROM LAYER 5	0.0001	0.0002	0.0003	0.0003	0.0002	0.0004
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.221	4.605	1.030	0.194	0.000	1.182
TOP OF LAYER 2	1.078	0.485	2.958	0.060	1.460	2.447
STD. DEVIATION OF DAILY	0.698	1.153	1.614	0.444	0.000	1.739
HEAD ON TOP OF LAYER 2	1.766	1.273	1.302	0.202	1.497	1.726
AVERAGE DAILY HEAD ON	0.002	0.003	0.002	0.001	0.000	0.001
TOP OF LAYER 6	0.000	0.001	0.001	0.001	0.001	0.001
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 6	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.44	10680330.000	100.00
RUNOFF	18.519	4772867.000	44.69
EVAPOTRANSPIRATION	23.283	6000778.500	56.19
PERC./LEAKAGE THROUGH LAYER 3	0.004360	1123.776	0.01
AVG. HEAD ON TOP OF LAYER 2	1.7268		
DRAINAGE COLLECTED FROM LAYER 5	0.0047	1199.104	0.01
PERC./LEAKAGE THROUGH LAYER 7	0.000009	2.221	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0011		
CHANGE IN WATER STORAGE	-0.367	-94525.117	-0.89
SOIL WATER AT START OF YEAR	554.294	142858176.000	
SOIL WATER AT END OF YEAR	553.927	142763648.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	7.964	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.40	2.09	2.46	3.63	4.49	5.60
	3.84	5.91	4.58	3.39	5.54	4.32
STD. DEVIATIONS	3.89	1.12	0.67	2.98	4.43	1.69
	2.20	3.64	1.17	2.12	1.48	2.76
RUNOFF						
TOTALS	4.804	0.827	0.345	1.447	1.671	2.323
	0.463	2.839	1.989	1.433	2.879	2.556
STD. DEVIATIONS	3.865	0.778	0.668	1.670	2.436	1.629
	0.560	2.612	1.280	1.207	1.211	2.804
EVAPOTRANSPIRATION						
TOTALS	1.632	1.980	1.980	2.321	2.532	3.453
	3.342	2.953	2.871	1.538	2.229	1.858
STD. DEVIATIONS	0.091	0.274	0.408	1.103	1.754	0.914
	1.711	1.481	0.540	0.970	0.465	0.290
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0010	0.0007	0.0003	0.0002	0.0002	0.0002
	0.0002	0.0002	0.0005	0.0003	0.0006	0.0008
STD. DEVIATIONS	0.0001	0.0002	0.0001	0.0001	0.0002	0.0001
	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
LATERAL DRAINAGE COLLECTED FROM LAYER 5						
TOTALS	0.0009	0.0008	0.0006	0.0004	0.0003	0.0002
	0.0002	0.0002	0.0004	0.0004	0.0004	0.0006
STD. DEVIATIONS	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0002	0.0001	0.0002	0.0002
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	4.7940	3.3243	1.3166	0.8315	0.7327	1.1499
	0.8020	1.1408	2.5160	1.5846	2.8746	3.7187
STD. DEVIATIONS	0.7475	0.9289	0.2751	0.4795	0.8134	0.3257
	0.8048	0.8931	0.9662	1.1286	1.3534	1.3362

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.0025	0.0025	0.0017	0.0011	0.0007	0.0007
	0.0006	0.0006	0.0011	0.0010	0.0013	0.0018
STD. DEVIATIONS	0.0005	0.0004	0.0003	0.0002	0.0003	0.0002
	0.0003	0.0004	0.0005	0.0004	0.0004	0.0006

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCENT
PRECIPITATION	52.23	(11.130)	13461750.0	100.00
RUNOFF	23.575	(8.8560)	6076079.00	45.136
EVAPOTRANSPIRATION	28.689	(4.6401)	7393925.50	54.925
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00526	(0.00064)	1355.658	0.01007
AVERAGE HEAD ON TOP OF LAYER 2	2.065	(0.257)		
LATERAL DRAINAGE COLLECTED FROM LAYER 5	0.00537	(0.00074)	1383.003	0.01027
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00001	(0.00000)	2.446	0.00002
AVERAGE HEAD ON TOP OF LAYER 6	0.001	(0.000)		
CHANGE IN WATER STORAGE	-0.037	(0.2679)	-9639.71	-0.072

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PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	5.88	1515452.370
RUNOFF	5.842	1505666.8700
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000040	10.41500
AVERAGE HEAD ON TOP OF LAYER 2	6.000	
DRAINAGE COLLECTED FROM LAYER 5	0.00003	8.95251
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000000	0.01265
AVERAGE HEAD ON TOP OF LAYER 6	0.003	
MAXIMUM HEAD ON TOP OF LAYER 6	0.192	
SNOW WATER	1.83	471727.1250

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4300
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2210

*** MAXIMUM HEADS ARE COMPUTED USING THE MOUND EQUATION. ***

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FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.1668	0.3611
2	0.0000	0.0000
3	10.2480	0.4270
4	525.6000	0.2920
5	0.5404	0.0450
6	0.0000	0.0000
7	15.3720	0.4270
SNOW WATER	0.000	

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APPENDIX 44

SITE LIFE TABLE

TABLE 1
TIMBERLANE LANDFILL SITE LIFE CALCULATION

	Total Available Volume (cubic yards)	Current Volume (cubic yards)	Remaining Volume (cubic yards)	% Filled	Remaining Life (Years)
Original Permit Area	9,445,497	0	9,445,497	0.0%	17.00

	Disposed cubic yards for that year	total in place cubic yards	cubic yards per day that year	No. years
2004	432,530	432,530	1,512	
2005	432,530	865,060	1,512	1
2006	454,157	1,319,217	1,588	2
2007	476,864	1,796,081	1,667	3
2008	500,708	2,296,788	1,751	4
2009	525,743	2,822,531	1,838	5
2010	552,030	3,374,561	1,930	6
2011	579,632	3,954,193	2,027	7
2012	608,613	4,562,806	2,128	8
2013	639,044	5,201,850	2,234	9
2014	670,996	5,872,846	2,346	10
2015	704,546	6,577,392	2,463	11
2016	739,773	7,317,165	2,587	12
2017	776,762	8,093,926	2,716	13
2018	815,600	8,909,526	2,852	14
2019	856,380	9,765,906	2,994	15
2020	899,199	10,665,105	3,144	16
2021	944,159	11,609,264	3,301	17

Assumptions:

286 days a year
5.5 days a week
980 tpd (initially)
5.0% per year growth rate
waste density = 48 pcf

Conversion Calculation:
980 ton/day x 1/48 ft3/lbs x 2000 lbs/ton x 1/27 cy/ft3 = 2314.8 cy/day x 52 week x 5.5 day/week = 432,530 cy/year

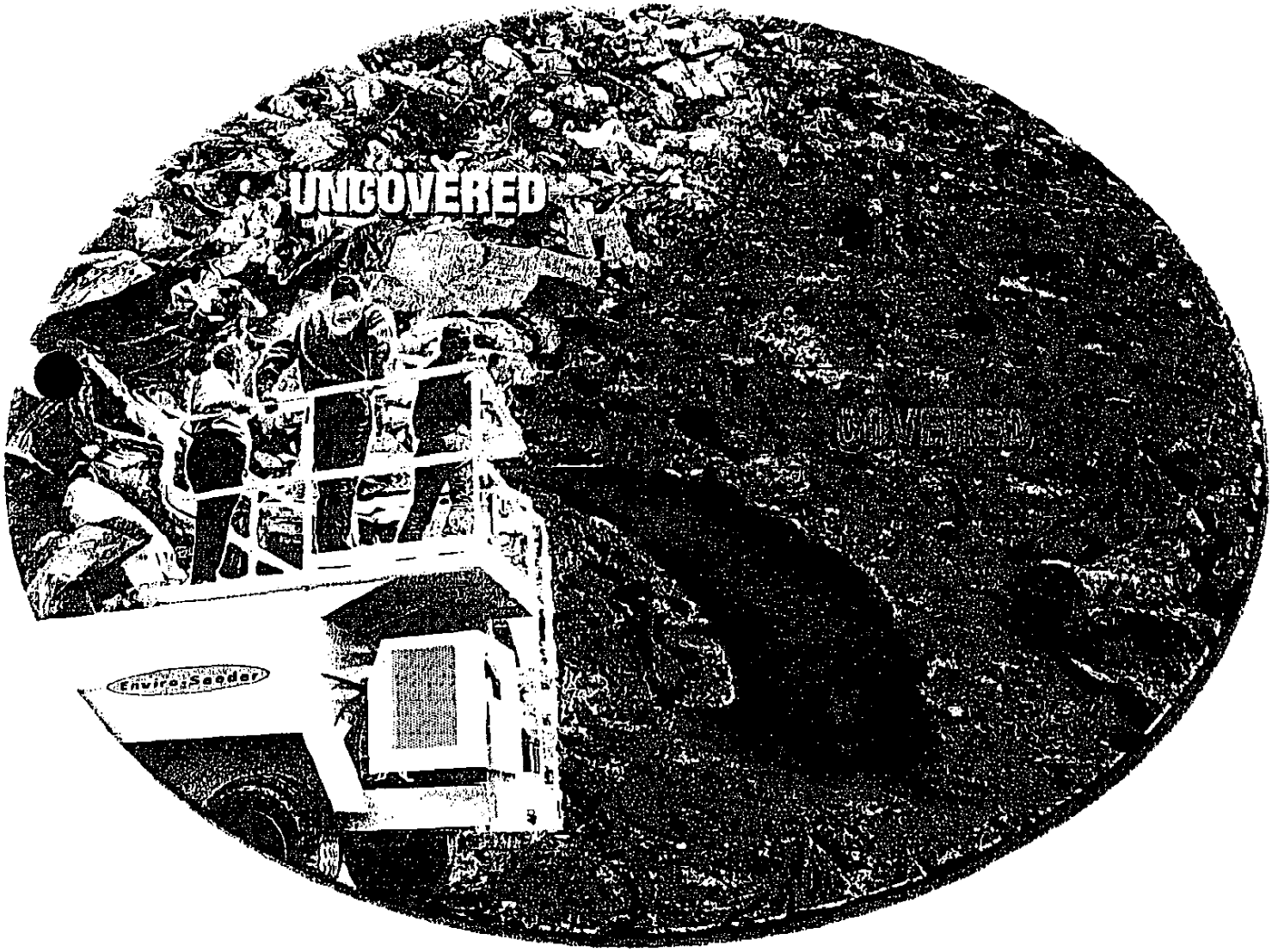
APPENDIX 45

ALTERNATE DAILY COVER SPECIFICATIONS

WASTE-COVER

DAILY LANDFILL COVER

By the year 2009, four of five landfills will be full!



SOUTHWEST ENVIRONMENT SERVICES, INC.

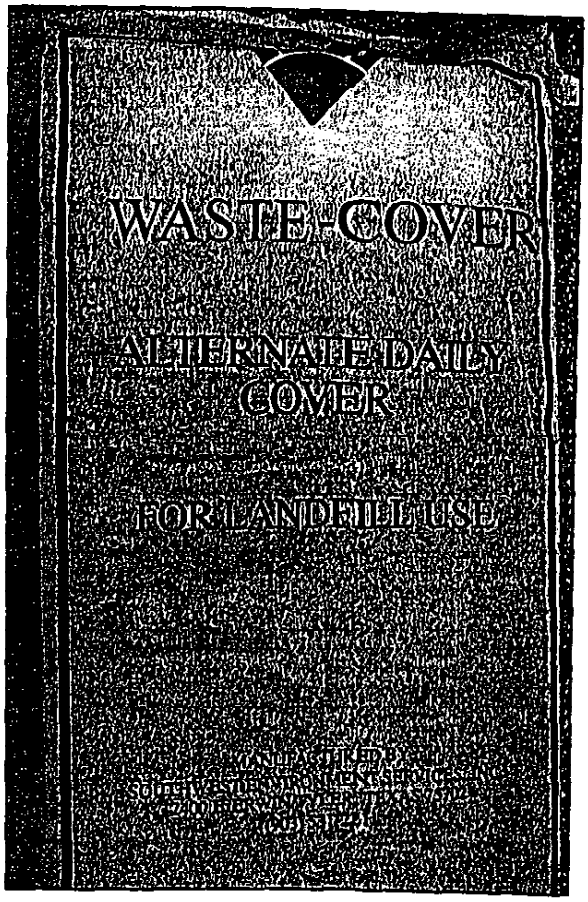
2400 E. ERWIN • P.O. BOX 134 • TYLER, TEXAS 75702
903/531/2211 • FAX 903/531-2312
Web Site – www.southwestenvironment.com

"A Leader in Erosion Control"

WASTE-COVER

WASTE-COVER is an alternate daily landfill cover manufactured from recycled paper and wood polymers, enzyme complex, and other proprietary ingredients. Waste-Cover helps breakdown the garbage faster and helps alleviate odors. All ingredients are non-toxic and biodegradable. Lend Mother Nature a helping hand, make your landfill more efficient by using Waste-Cover.

- Meets ASTM D6523-ADC
- Easy to mix
- Sprays easily
- Non-flammable
- Controls blowing litter
- Controls odor and disease vector
- Aesthetically acceptable
- Repels vermin
- One dry component, eliminates fine powders and dust
- Use conventional hydraulic mulching machines



Mix Ratio & Coverage Data

Mix ratio:	1 bag to 60 gallons water
Coverage (1 bag):	450 sq. ft. per bag

Application and Coverage Data

Tank	Amount Water	Pounds of Waste-Cover	Number of Bags	Coverage Sq.Ft.
500 gal.	420 gal.	350 lbs.	7	3150 sq. ft.
700 gal.	540 gal.	450 lbs.	9	4050 sq. ft.
900 gal.	780 gal.	650 lbs.	13	5850 sq. ft.
100 gal.	900 gal.	750 lbs.	15	6750 sq. ft.
1200 gal.	1020 gal.	850 lbs.	17	7650 sq. ft.
1500 gal.	1380 gal.	1150 lbs.	23	10350 sq. ft.

MATERIAL SAFETY DATA SHEET

Identity: **WASTE COVER**
(Alternate Daily Cover)

I. General Information

Manufacturer's Name:	Southwest Environment Services
Address:	2400 East Erwin, Tyler, Texas 75702
Telephone Number:	(903) 531-2211
HMIS Rating:	Health - 0 (normal material) Fire - 1 (flash point above 200°F) Reactivity - 0 (stable)

II. Hazardous Ingredients

Component:	Paper/Wood Mulch (as fibers) 67-68 % by wt
CAS:	9004-34-6 (as fibers), non-hazardous material except for potential of air-borne fibers.
OSHA PEL:	For fibers/dust - 15 mg/m³ (total), 5 mg/m³ (respirable)
Component:	Binder (non-specific) 30 % by wt
CAS:	26499-65-0
OSHA PEL:	For dust - 15 mg/m³ (total), 5 mg/m³ (respirable)
Component:	Ammonium sulfate 2 % by wt
CAS:	7783-20-2
OSHA PEL:	For dust - 15 mg/m³ (total), 5 mg/m³ (respirable)

Remaining Ingredients Constitute Less Than (<) 1 % of Product Material.

III. Physical Characteristics

Appearance:	Mulched solid, tan, grayish-green
Odor:	No discernible, characteristic odor
Density:	0.97 g/cm³
pH:	6.2
Solubility (in water):	Insoluble; will disperse in water
Melting/Boiling Point:	Not applicable
Reactivity in Water:	Non-reactive

IV. Fire and Explosion Hazard Data

Flash Point:	Greater than (>) 200°F
Combustibility:	Non-combustible at standard temperature and pressure, difficult to ignite.
Extinguishing Media:	Water/Foam
Fire Fighting Procedures:	Routine
Special Procedures:	None

V. Reactivity

Stability:	Stable
Compatibility:	For product integrity avoid excessive moisture or humidity until ready for use.
Conditions to Avoid:	None
Hazardous Polymerization:	Will not occur
Hazardous Decomposition:	None except those produced from typical combustion of normal materials (CO_2, CO).

VI. Health Hazard Data

Route(s) of Entry:	Inhalation (as dust/fibers), incidental ingestion, dermal/eye contact.
Primary route of Exposure:	Inhalation (as dust)
Effects of Overexposure:	Inhalation - mildly toxic as an acute irritant to mucus membranes and upper respiratory system. Ingestion - May cause gastrointestinal irritation, producing vomiting and/or diarrhea. Dermal/Eye Contact - May cause slight irritation to skin/eyes.
Carcinogenicity:	None
Aggravated Conditions:	Respiratory disorders or diseases may be aggravated by exposure from dust/fibers
Emergency/First Aid:	Inhalation - remove from exposure (remove to fresh air). If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician. Ingestion - None required for slight ingestion. For large ingested quantity, induce vomiting. Consult a physician. Dermal/Eye Contact - Wash material from skin using soap and water. In case of eye contact, flush eyes with water.

Working for a safer world

VII. Safe Handling and Use

Storage:	Maintain in original sealed containers provided by manufacturer. Material should be stored in a manner to prevent accumulations of airborne dust. Avoid excessive moisture/humidity to insure product integrity.
Releases or Spills:	Sweep/remove excess material and containerize.
Waste Disposal Method:	This material, as a waste and as provided by the manufacturer, is not a federally-defined hazardous waste (40 CFR 261). Dispose of in accordance with applicable Federal/State/Local requirements.

VIII. Special Protection/Control Measures

Respiratory Protection:	Respiratory protection required if OSHA PEL (dust) is exceeded. Use of a standard pollen/dust type mask is recommended as a precautionary measure.
Ventilation:	Normal ventilation is usually adequate to maintain exposure levels below OSHA PEL. Respiratory protection is required if allowable exposure level is exceeded.
Eye Protection:	The use of goggles and/or safety glasses are recommended as a precautionary measure.
Skin Protection:	The use of gloves is recommended as a precautionary measure if skin is broken or sensitive.
Work/Hygienic Practices:	Clean and properly operating personal protective equipment (PPE) when required. No other PPE recommended or required. Use standard hygienic practices as with most non-hazardous materials.

Date Prepared: 4/16/02

Prepared by:

Steven R. Kennedy, C.E.P./REM
ETTL Engineers & Consultants Inc.
Tyler, Texas
(903) 595-4421

Page 3 of 3 - MSDS - Waste Cover

LANDFILL SOLUTIONS
SPECIALIZING IN COVER, HYDROSEEDERS & ODOR CONTROL

PROCEDURE FOR APPLYING HYDROMULCH AS AN ALTERNATIVE DAILY COVER

TRAINING

The operators shall be familiar with the M.S.D.S. for all hydromulch material. Training will be conducted on the use of the material and the operations of the hydroseeder to properly apply the hydromulch.

MIXING PROCEDURE

The operator will mix the fiber material into the appropriate amount of water. Upon the addition of all bags of fiber, the total batch will be agitated at about half speed for a minimum of 15 minutes before application. The correct amount of all ingredients will be determined by the supplier. The total amount of the hydromulch to be applied is directly proportional to the size (square feet) of the active work face and the extent of the compaction of the surface. For each 900 square feet of active work face, the following amounts should be used:

Water	120 gallons
Waste-Cover	100 lbs.

APPLICATION PROCEDURE

The application of a hydromulch mixture should be done to the entire working face of the landfill at the end of the workday. This is best accomplished by directing the flow of hydromulch into the air allowing it to "rain down" onto the active working face. This will ensure that no shadows are created as a result of inadequate surface compaction. The operator may elect to apply the mulch from two directions to ensure that all areas are covered and all shadowing is eliminated. Complete coverage is required to meet LAC 33:V11.711.B.2. for controlling disease vectors, fire, odors, vermin, blowing litter, scavenging and creating an acceptable aesthetes. The hydromulch mixture must be applied to a thickness of 1/4 " or greater. This can be done from the tower of a standard hydroseeding machine.

If inclement weather conditions render the placement of hydromulch as a daily cover ineffective, the landfill shall temporarily revert to using another approved daily cover such as tarps or 6" of dirt.

The mixture of Waste-Cover is non-toxic, non-combustible, totally biodegradable, and harmless to fish, birds, plants, and animals.

Operation Plan:

- Fiber mulch mix will be applied as daily cover on well compacted exposed waste
- Materials will be mixed and applied to the entire active working face in accordance with the manufacturer's specification
- The application will be made at the end of each work day
- The hydromulch mixture will be applied with a landfill modified hydroseeder to a thickness of ¼" or greater
- The hydromulch applied as a slurry should be allowed to dry for approx. 2 hours depending on weather conditions
- Traffic will be restricted over the areas covered until the material has set.
- Hydromulch can be applied in moderate rain. During heavy inclement weather, other approved material will be used for daily cover
- Each application should last for seven days, after which additional waste must be added to the working face or another application of hydromulch could be performed

Based on local D.E.Q. requirements

P.O. BOX 83407 · BATON ROUGE, LA 70884-3407 · OFFICE: (225) 757-4994 · FAX: (225) 757-7994
LVMINC@BELLSOUTH.NET

PROCEDURE FOR APPLYING HYDROMULCH AS AN ALTERNATIVE DAILY COVER

TRAINING

The operators shall be familiar with the M.S.D.S. for all hydromulch material. Training will be conducted on the use of the material and the operations of the hydroseeder to properly apply the hydromulch.

MIXING PROCEDURE

The operator will mix the fiber material into the appropriate amount of water. Upon the addition of all bags of fiber, the binder will be added last and the total batch will be agitated at about half speed for a minimum of 15 minutes before application. The correct amount of all ingredients will be determined by the supplier. The total amount of the hydromulch to be applied is directly proportional to the size (square feet) of the active work face and the extent of the compaction of the surface. For each 900 square feet of active work face, the following amounts should be used:

1-Water	100 to 110 gallons
2-Waste-Cover	100 lbs. (2 Bags)

APPLICATION PROCEDURE

The application of a hydromulch mixture should be done to the entire working face of the landfill at the end of the workday. This is best accomplished by directing the flow of hydromulch into the air allowing it to rain down onto the active working face. This will ensure that no shadows are created as a result of inadequate surface compaction. The operator may elect to apply the mulch from two directions to ensure that all areas are covered and all shadowing is eliminated. Complete coverage is required to meet LAC 33:V11.711.B.2. for controlling disease vectors, fire, odors, vermin, blowing litter, scavenging and creating an acceptable aesthetes. The hydromulch mixture must be applied to a thickness of ¼" or greater. This can be done from the tower of a standard hydroseeding machine.

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Operation Plan

- Fiber mulch mix will be applied as daily cover on well compacted exposed waste
- Materials will be mixed and applied to the entire active working face in accordance with the manufacturer's specification
- The application will be made at the end of each work day
- The hydromulch mixture will be applied with a landfill modified hydroseeder to a thickness of ¼" or greater
- The hydromulch applied as a slurry should be allowed to dry for approx. 1 to 2 hours depending on weather conditions
- Traffic will be restricted over the areas covered until the material has dried
- Hydromulch can be applied in moderate rain. During heavy inclement weather, other approved material will be used for daily cover
- Each application should last for seven days[1], after which additional waste must be added to the working face or another application of hydromulch could be performed

[1]Based on local D.E.Q. requirements

STE
Soil Testing Engineers, Inc.
316 HIGHLANDIA DRIVE (70810) • P.O. BOX 63710 (70884) • BATON ROUGE, LOUISIANA
PHONE (225) 752-4790 • FAX (225) 752-4878 • www.steofla.com

GORDON P. BOUTWELL, JR., Ph.D.
CHING N. TSAI, Ph.D.
DANIEL J. HOLDER, MS
CHAD M. POCHE, MS
CHARLES S. HEDGES, MS
KENNETH A. FLUKER, MS
ZIAD H. ALEM, MS
STEVE M. MEUNIER
KELLIE T. MCNAMARA

November 21, 2001

Louisiana Vegetation
Post Office Box 33812
Baton Rouge, Louisiana 70884

Attn: Mr. Don Breaux

Re: Alternative Daily Cover
Flammability Potential
STE File: 01-3044

Gentlemen:

We have completed the Flammability Potential Screening Analysis of Waste (ASTM D4982-95) on a sample of *WASTE COVER* submitted by Mr. Andrew St. Pierre on November 21, 2001. Method A of the above procedure was performed on the sample submitted. Following Section 9 (Procedure) of Method A the sample was found to have a negative Flammability Potential.

If you have any questions concerning this information, please contact us at 225-752-4790.

Sincerely,
Soil Testing Engineers, Inc.

Ching-Nien Tsai, Ph.D., P.E.
Chief Engineer

George L. Perkins, C.E.T.
QC Manager

GLP/kab

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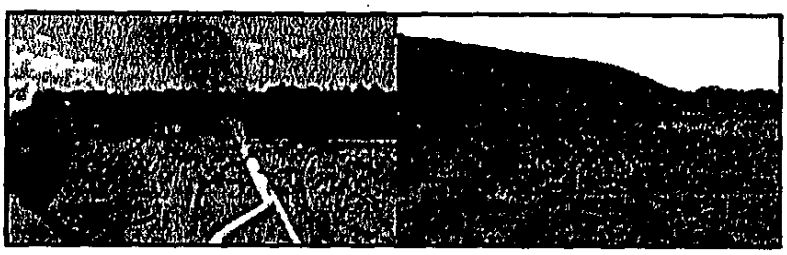
LSC Landfill Service CORPORATION

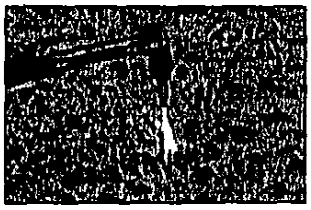
Posi-Shell® COVER SYSTEM



Description

Posi-Shell Cover is a spray-applied, cement-mortar coating, similar to stucco, used for landfill daily cover, intermediate cover, erosion prevention, and odor control.

Posi-Shell replaces costly, and sometimes scarce soil as daily cover of landfill solid waste, thereby preserving a valuable natural resource, as well as conserving valuable air space, and greatly extending the life of a landfill.



Simple to mix and easy to use, the Posi-Shell Cover System consists of a liquid base, a mineral binder, and specialized Posi-Pak fibers. Because it forms a durable, non-flammable crust that resists wind and water erosion, Posi-Shell is also ideal for applications such as erosion control, ditch-lining, dust control, cover for contaminated soil, compost, coal, or cement clinker piles, mining applications, voc suppression, sludge tar lagoons, and similar industrial purposes.

POSI-SHELL ADVANCED FORMULATION

The Posi-Shell Advanced Formulation (AF) Cover System is a low-cost, versatile alternative to traditional landfill daily cover materials and is the ideal solution for both small and large landfills and industial projects. It offers the same non-flammable durability as the traditional formulation of Posi-Shell, but our unique setting agent comes in bags for easy mixing and strorage, plus it can be applied with common hydro-seeding equipment.

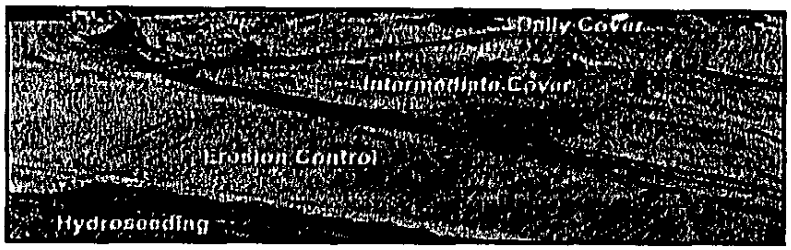
Posi-Shell AF is a spray-on slurry composed of water, Posi-Pak Type P-100 Fibers, PSM-200™ Setting Agent, and optionally, Portland cement. Like the traditional formulation of Posi-Shell, the Advanced Formulation hardens to a stucco-like cover that meets and exceeds regulatory requirements for the control of landfill vectors, fires, odors, blowing litter, and scavenging.

Main Office
2183 Pennsylvania Avenue
Apalachin, NY 13732 USA

1 800 800 7671
Phone: 607 625 3050
Fax: 607 625 2689

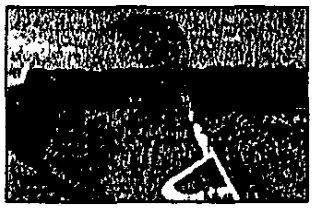
Landfill Service CORPORATION

Posi-Shell® COVER SYSTEM

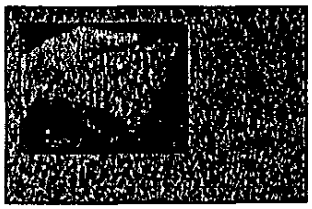


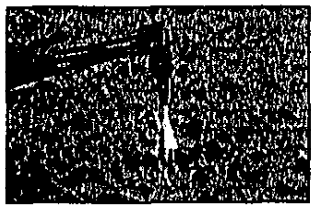
DAILY, INTERMEDIATE, AND LONG-TERM COVER

Posi-Shell has been approved for daily cover, and intermediate and long-term cover for landfills, stockpiles, and hazardous waste sites. The primary component of the formulation is a cementitious mineral binder reinforced with structural composite fibers, which results in excellent resistance to erosion and cracking and provides long-term durability in various weather conditions.

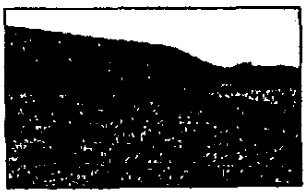


Applying Posi-Shell cover is a simple one-person operation using either the specialized Posi-Shell equipment with the traditional Posi-Shell formulation, or a standard hydroseeding unit and Posi-Shell Advanced Formulation. One load of Posi-Shell requires just one hour for mixing, application, and rinse-out. Landfill operators realize a huge savings in airspace, labor, machinery, and fuel costs through use of the Posi-Shell Cover System over traditional soil cover.





After application, the Posi-Shell slurry hardens to a non-flammable and highly impermeable coating that easily conforms to the irregular contours of a landfill. Its color and texture provide a uniform appearance that is aesthetically appealing to nearby residents; and because of its inherent alkalinity, Posi-Shell suppresses typical landfill odors as well.



Posi-Shell is highly effective in preventing wind-blown litter, landfill fires, scavenging, and vector problems. Posi-Shell has met the rigorous standards required for approval by numerous state regulatory agencies and has been favorably

evaluated for Superfund use by the USEPA. Made of non-flammable, non-toxic materials, Posi-Shell is an environmentally compatible, multi-purpose landfill cover solution.

Posi-Shell Cover System:

- Conserves airspace
- Mitigates odors
- Reduces airborne debris
- Controls vector populations
- Enhances safety through non-flammability
- Discourages scavenging
- Cuts operating expenses
- Extends landfill life
- Increases profits

Main Office
2183 Pennsylvania Avenue
Apalachin, NY 13732 USA

1 800 800 7671
Phone: 607 625 3050
Fax: 607 625 2689

Posi-Shell®
COVER SYSTEM

BRIEF SPECIFICATIONS

- Spray applied mortar containing greater than 50% by weight, cementitious mineral binder
- Fiber reinforced mixture incorporating quarter-inch very fine (1.5 ± 0.2) denier polyester fibers with proprietary finish for rapid, non-clumping, aqueous dispersal
- Non-combustible, non-fuel contributing, and non-smoke releasing in accordance with ASTM 1354
- No free liquid in accordance with paint filter test (negative result for SW-846)
- Hydraulic conductivity not greater than 1 x 10^{-5} cm/sec when cured
- Non-toxic as indicated by TCLP testing
- Self-contained diesel/hydraulic mineral binder storage silo with 50 ton Portland Cement capacity, capable of feeding 1 ton per minute into mixer-applicator
- Self-contained diesel/hydraulic towable mixer-applicator with 2000 gallon minimum slurry capacity capable of mixing load within 10 minutes. Progressing cavity mortar pump able to shoot mortar slurry 150 ft @ 100 GPM

Posi-Shell®
COVER SYSTEM
ADVANCED FORMULATION

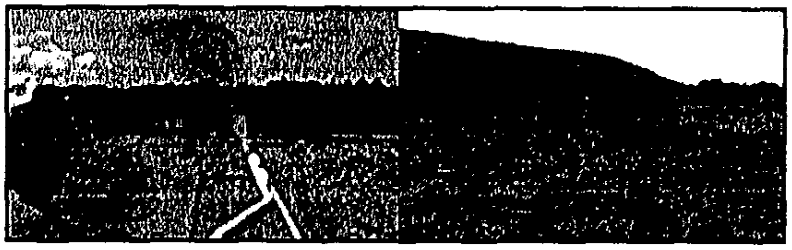
BRIEF SPECIFICATIONS

- Spray applied mortar containing approximately 25% by weight, cementitious mineral materials
- Excellent opacity and adhesion to heterogeneous waste materials
- Fiber reinforced mixture incorporating quarter-inch very fine (1.5 ± 0.2) denier polyester fibers with proprietary finish for rapid, non-clumping, aqueous dispersal
- Complies with ASTM D6523 "Evaluation and Selection of Alternate Daily Covers (ADC) for Sanitary Landfills
- Non-flammable in accordance with ASTM D4982 "Flammability Potential Screening Analysis for Waste"
- No free liquid in accordance with paint filter test (negative result for SW-846)
- Non-toxic as indicated by TCLP testing
- Can be applied with commonly available hydroseeding equipment, or with specialized landfill ADC machines

Posi-Shell® Cover System is patented technology in the U.S. and Internationally
Posi-Shell® and Posi-Pak® are registered trademarks of Landfill Service Corporation

LSC Landfill Service CORPORATION

Posi-Shell® COVER SYSTEM



Application Coverage Rates

Main Office
2183 Pennsylvania Avenue
Apalachin, NY 13732 USA

1 800 800 7671
Phone: 607 625 3050
Fax: 607 625 2689

American Standards Testing Bureau, Inc.

40 WATER STREET, NEW YORK, N.Y. 10004 • PHONE: (212) 943-3156 • FAX: (212) 943-2260

July 20, 1995

Landfill Service Corporation
2183 Pennsylvania Avenue
Apalachin, NY 13732

Att: Mr. George Nealon

Gentlemen:

RE: Heat & Visible Smoke Release Rates for Posi-Shell
ASTB P. #1235-536; LR. #29807

Pursuant to your recent request, ASTB/New York received and tested the heat and visible smoke release rates for one (1) Posi-Shell Cover System product as per the requirements of ASTM E-1354. The nominal heat fluxes were 25, 35 and 50 kW/m², respectively, and all specimens were tested in the horizontal orientation.

The Posi-Shell sample tested did not ignite at 25, 35 or 50 kW/m². At the most extreme heat flux, 50 kW/m², the mass loss of the specimen was 8.9%, although little or no smoke was observed. The measured peak and average values of the heat and visible smoke release rates at 50 kW/m² are:

PEAK AND AVERAGE VALUES (50 kW/m²)		PEAK	TIME	AVERAGE
Heat Release Rate	(kW/m²)	6.9	167	3.6
Eff. Heat of Comb.	(MJ/kg)	827.8	512	2.7
Specific Ext. Area	(m²/kg)	4.2	17	0.4
CO	(kg/kg)	0.0	600	0.0
CO2	(kg/kg)	0.8	380	0.0

Since ignition did not occur, the heat release rate, total heat released and effective heat of combustion are not considered to be useful data but are reported for completeness. In summary, the Posi-Shell examined must be classified as non-combustible, non-fuel contributing and non-smoke releasing material.

Respectfully submitted,

AMERICAN STANDARDS TESTING BUREAU, INC.

S. C. Brooks, P.E.
Project Engineer

V. Morfopoulos, Eng.Sc.D.
Technical Director

SCB/VM/dk
Enc.

AN INDEPENDENT TECHNICAL AGENCY FOR CERTIFICATION, CONSULTING, RESEARCH AND DEVELOPMENT, SAMPLING AND TESTING
EXPERT CHEMICAL, ELECTRICAL, MECHANICAL AND METALLURGICAL INVESTIGATIONS SERVING INDUSTRY AND PROFESSIONS
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SOIL & MATERIAL TESTING, INC.
57 SOUTH MAIN STREET • CASTLETON, N.Y. 12033

Office	Telephone	Office	Telephone
Castleton	(518) 732-7205	Binghamton	(607) 722-1582
	Fax (518) 732-4516	Kingston	(914) 336-4471
		Pittsfield	(413) 499-5338

HYDRAULIC CONDUCTIVITY TEST DATA

Project Name: **LANDFILL SERVICE CORP. POSI-SHELL**

Client: Landfill Technologies, Inc.
PO Box 519
West Sand Lake, New York 12196

SMT Project No. 80799

Sample Description: Visual Description:
Gray Cementitious Material
Sample #1
Undisturbed Shelby Tube Specimen:

Date Sampled: 10/23/95
Date Reported: 10/31/95

Date Tested: 10/27/95
Reviewed By: REV RW

Test Standard: ASTM D 5084
Test By: DW

Test Description: Falling Head/Rising tail Flexible Wall Permeability

---

RESULTS:

Initial Specimen Properties	Test Conditions
Length = 8.20 cm	Back Pressure = 66.0 psi
Diameter = 7.21 cm	Cell Pressure = 70.0 psi
Moisture Content = 63.0%	Hydraulic Gradient = 10
Wet Density = 96.5 pcf	Permeant Liquid: Air-less Tap Water
Dry Density = 59.2 pcf	

Remarks:

Hydraulic Conductivity: $k_{20} = 1.5 \times 10^{-6}$ cm/sec

SOIL & MATERIAL TESTING, INC.

Thomas M. Kenney

SOIL & MATERIAL TESTING, INC.
57 SOUTH MAIN STREET • CASTLETON, N.Y. 12033

Office	Telephone	Office	Telephone
Castleton	(518) 732-7205 Fax (518) 732-4516	Binghamton	(607) 722-1582
		Kingston	(914) 336-4471
		Pittsfield	(413) 499-5338

HYDRAULIC CONDUCTIVITY TEST DATA

Project Name: **LANDFILL SERVICE CORP. POSI-SHELL**

Client: Landfill Technologies, Inc.
PO Box 519
West Sand Lake, New York 12196

SMT Project No. 80799

Sample Description: Visual Description:
Gray Cementitious Material
Sample #2
Undisturbed Shelby Tube Specimen:

Date Sampled: 10/23/95
Date Reported: 10/31/95

Date Tested: 10/27/95
Reviewed By: REV RW

Test Standard: ASTM D 5084
Test By: DW

Test Description: Falling Head/Rising tail Flexible Wall Permeability

---

RESULTS:

Initial Specimen Properties	Test Conditions
Length = 12.36 cm	Back Pressure = 66.0 psi
Diameter = 7.16 cm	Cell Pressure = 70.0 psi
Moisture Content = 60.1%	Hydraulic Gradient = 10
Wet Density = 95.5 pcf	Permeant Liquid: Air-less Tap Water
Dry Density = 59.7 pcf	

Remarks:

Hydraulic Conductivity: $k_{20} = 5.8 \times 10^{-6}$ cm/sec

SOIL & MATERIAL TESTING, INC.

Thomas M. Kenney

Adirondack Environmental Services, Inc.
Experience is the solution
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CLIENT: Landfill Services Corporation
CLIENT'S SAMPLE ID: POSI-SHELL
AES sample #: 001227AN01
Samples taken by: G.E./D.B.
MATRIX: Solid Sample
Date Sampled: 12/19/00
Date sample received: 12/27/00
Location: Chemung County grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Flammability Potential	ASTM D 4982-95	Negative		TF-H-22	12/27/00

Albany, NY • Saratoga Springs, NY • New Haven, CT

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CLIENT: Landfill Technologies, Inc. Date Sampled: 07/24/95
CLIENT'S SAMPLE ID: POSI-SHELL (WET) Date sample received: 07/24/95
AES sample #: 950724 001 Samples taken by: Dave Hansen Location: Albany, NY
MATRIX: Product Test grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Paint Filter	SW-846	Negative		HC-X-8	07/24/95

APPROVED BY: Sara [illegible]
Report date: 07/26/95

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CHAIN OF CUSTODY RECORD

CLIENT NAME LANDFILL TECHNOLOGIES, INC	PROJECT NAME (Location)	SAMPLERS: (Names) DAVE HANSEN
ADDRESS	PO NUMBER	SAMPLERS: (Signature)

AES SAMPLE NUMBER	CLIENT SAMPLE IDENTIFICATION & LOCATION	DATE SAMPLED	TIME A=a.m. P=p.m.		SAMPLE TYPE MATRIX	COMP	GRAB	NUMBER OF CONT'S	ANALYSIS REQUIRED
950724001	POSI-SHELL (WET)	24JUL95	11	A P	SL		X	1	Free Liquids
				A P					Method 9095
				A P					SW 846
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					

Turnaround Time: 24 hour. Laboratory Approval:

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Dispatched by: (Signature) Date/Time	Received for Laboratory by:	Date/Time 7/24/95 1:20
Method of Shipment:	Send Report To:	Client Phone No.:

The Laboratory reserves the right to return hazardous samples to the client or may levy an appropriate fee per container for disposal.

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

POSI-SHELL® TCLP ANALYSIS

The following table summarizes the TCLP results for the Posi-Shell mixture and its individual components.

Concentration, mg/l

COMPONENT	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
Mineral Binder (CKD)	<0.5	0.38	0.02	<0.05	<0.5	<0.02	<0.1	<0.05
Posi-Pak® Fiber	<0.5	0.43	<0.01	<0.05	<0.5	<0.02	<0.1	<0.05
EarthTone Dye (Brown)	<0.5	0.34	0.02	<0.05	<0.5	<0.02	<0.1	<0.05
Posi-Shell mix (field - fresh)	<0.5	0.22	<0.01	<0.05	<0.5	<0.02	<0.1	<0.05
Posi-Shell mix (fresh - lab)	<0.5	0.30	<0.01	<0.05	<0.5	<0.02	<0.1	<0.05
Posi-Shell mix (one yr. old)	<0.5	0.08	<0.01	0.08	<0.5	<0.02	<0.1	<0.05
Regulatory Level	5.0	100.0	1.0	5.0	5.0	0.2	1.0	5.0

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CLIENT: Landfill Technologies, Inc.
CLIENT'S SAMPLE ID: IND CKD J92
AES sample #: 920616 J01
Samples taken by: David Hansen
MATRIX: solid waste
Date Sampled: June 1992
Date sample received: 06/16/92
Location: Albany Landfil
grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DAT
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/9
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Barium-TCLP Extract	EPA-6010	0.38	mg/l	ICP-Y-18	07/01/9
Cadmium-TCLP Extract	EPA-6010	0.02	mg/l	ICP-Y-18	07/01/9
Chromium-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-30B	07/18/9
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-FAB-39	06/24/9
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/9
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/9

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CLIENT: Landfill Technologies, Inc. Date Sampled: June 1992
CLIENT'S SAMPLE ID: Fiber Date sample received: 06/16/92
AES sample #: 920616 J03 Samples taken by: David Hansen Location: Albany Landfi
MATRIX: solid waste grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DA
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/
Barium-TCLP Extract	EPA-6010	0.43	mg/l	ICP-Y-18	07/01/
Cadmium-TCLP Extract	EPA-6010	<0.01	mg/l	ICP-Y-18	07/01/
Chromium-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-30B	07/18/
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-FAB-39	06/24/
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/

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Albany, New York 12207
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CLIENT: Landfill Technologies, Inc. Date Sampled: June 1992
CLIENT'S SAMPLE ID: E-Tone Date sample received: 06/16/92
AES sample #: 920616 J04 Samples taken by: David Hansen Location: Albany Landfill
MATRIX: solid waste grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/92
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/92
Barium-TCLP Extract	EPA-6010	0.34	mg/l	ICP-Y-18	07/01/92
Cadmium-TCLP Extract	EPA-6010	0.02	mg/l	ICP-Y-18	07/01/92
Chromium-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-30B	07/18/92
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/92
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-FAB-39	06/24/92
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/92
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/9

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Albany, New York 12207
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CLIENT: Landfill Technologies, Inc. Date Sampled: 06/16/92
CLIENT'S SAMPLE ID: PS-1 WP (POSI-SHELL, FIELD) Date sample received: 06/16/92
AES sample #: 920616 J05 Samples taken by: David Hansen Location: Albany Landfil
MATRIX: solid waste grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REP	TEST DAT
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/9
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Barium-TCLP Extract	EPA-6010	0.22	mg/l	ICP-Y-18	07/01/9
Cadmium-TCLP Extract	EPA-6010	<0.01	mg/l	ICP-Y-18	07/01/9
Chromium-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-30B	07/18/9
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-PAB-39	06/24/9
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/9
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/9

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CLIENT: Landfill Technologies, Inc. Date Sampled: 06/16/92
CLIENT'S SAMPLE ID: PS-1 WL (POSI-SHELL, LAB) Date sample received: 06/16/92
AES sample #: 920616 J06 Samples taken by: David Hansen Location: Albany Landfi
MATRIX: solid waste grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REP	TEST DAT
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/9
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Barium-TCLP Extract	EPA-6010	0.30	mg/l	ICP-Y-18	07/01/9
Cadmium-TCLP Extract	EPA-6010	<0.01	mg/l	ICP-Y-18	07/01/9
Chromium-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-30B	07/18/9
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/9
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-FAB-39	06/24/9
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/9
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/9

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CLIENT: Landfill Technologies, Inc. Date Sampled: June 1991
CLIENT'S SAMPLE ID: PS-JY (POSI-SHELL, 1 YEAR OLD) Date sample received: 06/16/92
AES sample #: 920616 J07 Samples taken by: David Hansen Location: Albany Landfi
MATRIX: solid waste grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DA
TCLP Extraction	EPA-1311	Complete		EPT-D-4	06/19/
Arsenic-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/
Barium-TCLP Extract	EPA-6010	0.08	mg/l	ICP-Y-18	07/01/
Cadmium-TCLP Extract	EPA-6010	<0.01	mg/l	ICP-Y-18	07/01/
Chromium-TCLP Extract	EPA-6010	0.08	mg/l	ICP-Y-30B	07/18/
Lead-TCLP Extract	EPA-6010	<0.5	mg/l	ICP-Y-18	07/01/
Mercury-TCLP Extract	EPA-7470	<0.02	mg/l	MET-FAB-39	06/24/
Selenium-TCLP Extract	EPA-6010	<0.1	mg/l	ICP-Y-18	07/01/
Silver-TCLP Extract	EPA-6010	<0.05	mg/l	ICP-Y-18	07/01/

Posi-Shell AF, 2 ton mix with portland

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RECEIVED JUL 19 2006

July 13, 2006

Joel E. Lanz
Landfill Service Corporation
2183 Pennsylvania Avenue
Apalachin, NY 13732

TEL: (607) 625-3050
FAX: (607) 625-2689

Work Order No: 060630045

RE: Product testing

Dear Joel E. Lanz:

Adirondack Environmental Services, Inc received 3 samples on 6/30/2006 for the analyses presented in the following report.

There were no problems with the analyses and all associated QC met EPA or laboratory specifications, except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Tara Daniels
Laboratory Manager

ELAP#: 10709
AIHA#: 100307

Qualifiers:		
	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quanititation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	T - Tentitively Identified Compound-Estimated Conc.
	X - Value exceeds Maximum Contaminant Level	E - Value above quantitation range

Adirondack Environmental Services, Inc

Date: *13-Jul-06*

CLIENT:	Landfill Service Corporation	Client Sample ID:	Posi-AF Petri#2
Work Order:	060630045	Collection Date:	
Project:	Product testing	Lab Sample ID:	060630045-002
PO#:		Matrix:	SOLID

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TCLP ICP METALS SW6010B/1311 (Prep: SW1311 - 7/5/2006)						Analyst: SM
Aluminum-TCLP	< 1.0	1.0		mg/L	1	7/13/2006 1:18:00 PM
Antimony-TCLP	< 0.60	0.60		mg/L	1	7/13/2006 1:18:00 PM
Arsenic-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Barium-TCLP	1.3	0.10		mg/L	1	7/13/2006 1:18:00 PM
Beryllium-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Boron-TCLP	< 0.50	0.50		mg/L	1	7/13/2006 1:18:00 PM
Cadmium-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Chromium-TCLP	0.16	0.050		mg/L	1	7/13/2006 1:18:00 PM
Cobalt-TCLP	< 0.50	0.50		mg/L	1	7/13/2006 1:18:00 PM
Copper-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Iron-TCLP	< 0.50	0.50		mg/L	1	7/13/2006 1:18:00 PM
Lead-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Magnesium-TCLP	< 0.50	0.50		mg/L	1	7/13/2006 1:18:00 PM
Manganese-TCLP	< 0.20	0.20		mg/L	1	7/13/2006 1:18:00 PM
Molybdenum-TCLP	< 0.10	0.10		mg/L	1	7/13/2006 1:18:00 PM
Nickel-TCLP	< 0.20	0.20		mg/L	1	7/13/2006 1:18:00 PM
Selenium-TCLP	< 0.050	0.050		mg/L	1	7/13/2006 1:18:00 PM
Silver-TCLP	< 0.10	0.10		mg/L	1	7/13/2006 1:18:00 PM
Thallium-TCLP	< 0.10	0.10		mg/L	1	7/13/2006 1:18:00 PM
Titanium-TCLP	< 0.10	0.10		mg/L	1	7/13/2006 1:18:00 PM
Vanadium-TCLP	< 0.20	0.20		mg/L	1	7/13/2006 1:18:00 PM
Zinc-TCLP	< 0.10	0.10		mg/L	1	7/13/2006 1:18:00 PM
Zirconium-TCLP	< 0.50	0.50		mg/L	1	7/13/2006 1:18:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
X - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
T - Tentitively Identified Compound-Estimated Conc.
E - Value above quantitation range

ASSESSMENT OF COVER APPLICATION TO REDUCE AIR EMISSIONS FROM HAZARDOUS WASTE

LAIDLAW - CORUNNA FACILITY

SARNIA, ONTARIO

Project Number: 97-411

Date: December 22, 1997

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1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Laidlaw Environmental Services Limited (Laidlaw) to undertake an assessment of Posi-Shell, a cover material, to reduce air emissions of volatile organic compounds (VOC's), aldehydes, ketones and alcohols from the exposed waste at Laidlaw's Corunna Facility. Posi-Shell is described by its supplier as an aggregate of (recycled) cementitious mineral binder, liquid (water), recycled plastic and cellulose fibres. After curing, the cover is considered to provide an non-permeable cover over the exposed waste, minimising any chemical emissions.

The objectives of this study was to provide an independent assessment of the cover's ability to surpress odourous emissions up to three weeks after application.

The basic tasks undertaken in this study are described below:

- select three sampling locations on the exposed waste at the pit face of the landfill;
- determine the emission rate of target compounds, prior to application, using an isolation flux chamber;
- determine the emission rates of the target compounds one day, two days, one week, two weeks and three weeks after application; and
- assess the emission reduction efficiency of the foam.

2. METHODOLOGY

2.1 Selected Target Compounds

Table 1 presents the list of selected target compounds. The list was based on sampling and headspace analysis conducted by Laidlaw at three Test-Bucket locations on the landfill pit face (Pit Cell #17) during July 11 and 14, 1997 [1]. Figure 1 shows a site map with the three sample locations. Shows a site plan of the facility including the three sample locations The list represents a cross-section of contaminants that are common to the waste stream at the Corunna facility.

Table 1: List of Target Compounds.

Acetone	o-Xylene
Benzene	p-,m-Xylene
Butanediol	Propanal
1-Butanol	Propanol
2-Butanol	Styrene
Butenal	Tetrachlorethylene
Chlorobenzene	1,3,5-Trimethyl Benzene
Cyclohexane	1,2,4-Trimethyl Benzene
Ethyl Benzene	1,2,3-Trimethyl Benzene
Heptane	Toluene
Methyl Ethyl Ketone	Acetaldehyde
2-Methyl Hexane	Difuro-Furan
3-Methyl Hexane	Dichloromethane
Methyl Isobutyl Ketone	Ethanol
Methyl Pentanone	Methyl Butanol

2.2 Sampling Protocol

In the original work plan submitted by RWDI to Laidlaw, it was proposed to conduct continuous VOC measurements over the surface of the pit face, using a PhotoVac Microfid Model MP 1001, in order to select locations with significant emissions which were also safely accessible. These measurements were conducted on July 22, 1997; however, they proved to be inconclusive in locating areas of peak emissions because of relatively low and uniform VOC concentrations above

the pit face. Therefore, it was decided to locate the sampling points in close proximity to the existing Laidlaw Test-Drum locations (see Section 2.1).

The flux chamber was then used to collect samples at these three locations. The flux chamber is shown schematically in Figure 2. It was constructed according to the designer's specifications [2]. The chamber is 71 cm in diameter and 31 cm high and is constructed of 14 gauge stainless steel. All interior and exterior fittings were stainless steel and all lines were made from Teflon tubing. The chamber was equipped with five exit ports (labelled A to E in Figure 2), air and waste temperature probes and a chamber differential pressure gauge. The flux chamber was placed on the surface of the waste and the bottom edge of the chamber was forced a short depth into the waste surface. The interface between the chamber and the surface was covered with common sand to provide the best seal possible. The flux chamber was operated under a slight positive pressure to further prevent outside air entering underneath and into the chamber.

The flux chamber was operated within parameters recommended by the designers [2]. The flux chamber was purged with ultra-high purity nitrogen gas for a minimum of 30 minutes at a rate of 17 l/min (2.83×10^{-4} m^3/s). This removed any residual outside air present in the chamber after it was placed on the surface of the waste. The purpose of diluting the chamber air was to establish an equilibrium between gas emissions from the sample surface and the sweep gas entering the chamber. The purge gas was introduced into the flux chamber using Teflon tubing equipped with fifteen, 0.635 mm diameter, downward-facing vent holes. The flow of purge gas (sweep rate) was regulated using a Matheson rotameter, which was calibrated using a Gilibrator automated bubble meter, which is a primary standard airflow calibrator. The total amount of purged gas introduced into the chamber was such that about 99% of the original air was purged from the flux chamber. Once the flux chamber had been purged, samples were drawn from the chamber through the exhaust port using a sample train consisting of a vacuum pump and a calibrated mass flow controller. The samples were collected by on a multi-phase carbon adsorbent TO1 tubes with Tenax provided by Laidlaw Environmental. The on-site Laidlaw laboratory conducted the analysis for the compounds shown in Table 1.

The concentration for each compound, C, was determined using Equation 1:

$$C = M/V \qquad (1)$$

where: C = *VOC concentration* (ng/m^3);
M = *mass on tube* (ng); *and*
V = *total volume of air sampled* (m^3).

The emission flux rate ($ng/m^2/s$) was determined using Equation 2:

$$E = \frac{C\,Q}{A} \qquad (2)$$

where: E = *VOC flux rate* ($ng/m^2/s$);
Q = *sweep rate of nitrogen into the flux chamber* = 2.83×10^{-4} m^3/s; *and*
A = *surface area enclosed by the flux chamber* = 0.40 m^2.

The flux chamber requires low wind speeds to sample properly. Strong winds may create a region of low pressure on the downwind side of the flux chamber. Winds were light during the flux chamber sampling and no provisions for wind breaks were required.

3. RESULTS

3.1 Sampling Results

The site selection and initial sampling, before cover application, was carried out on July 22, 1997. Covering of the pit face (approximately 90% of the exposed waste) was carried out by the supplier, Landfill Service Corporation, on July 23. After the cover was applied and the curing process was underway, sampling was repeated one day (July 24), two days (July 25), one week (July 31), two weeks (August 7) and three weeks (August 14) after covering. Sections 3.1.1 to 3.1.6 presents pertinent sampling information and the results. Sections 3.2 presents a summary of the results and emission reduction efficiency. All field note information taken during the study have been included in summary tables. All times are given in Eastern Daylight (Savings) Time (EDT).

3.1.1 Site Selection and Pre-Cover Application Sampling

Sample site selection and sampling prior to cover application was conducted on July 22. Table 2 presents a description of the sampling site locations.

Table 2: Sampling Locations.

Sample Number	Location
Site 1	Two metres west of Laidlaw Test-Bucket #3
Site 2	Two metres west of Laidlaw Test-Bucket #2
Site 3	½-metre south of Laidlaw Test-Bucket #1

The sampling parameters (start time, end time, etc.) are presented in Table 3.

Table 3: Sampling Parameters - July 22, 1997.

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	1355	1455	1552
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	1436	1531	1629
Sample End (hours)	1451	1548	1644
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ("H_2O)	0.055	0.050	0.050
Waste Temperature (C)	31	31	36
Ambient Temperature (C)	25	25	27
Wind Speed (m/s)	2.0	2.8	3.0
Weather Conditions	Sunny/Clear	Sunny/Clear	Sunny/Clear
Sample Tube Number	D	B	E

Table 4 presents the pre-cover sampling results. The table shows the emission rate in $ng/m^2/s$ for the target compounds at each sampling location.

Table 4: Pre-Cover Initial Sampling Results - July 22,1997.

Target Compound	Emission Rate (ng/m²/s)		
	Site 1	Site 2	Site 3
Acetone	11.8	2.61	14.5
Benzene	0.80	0.58	0.96
1-Butanol	0.64	0.00	1.44
Butanediol	5.58	0.00	18.8
2-Butanol	0.00	0.00	1.91
Butenal	0.48	0.00	0.48
Chlorobenzene	0.16	0.00	0.48
Cyclohexane	0.48	0.00	0.48
Ethyl Benzene	4.62	0.73	3.99
Heptane	0.00	0.00	0.80
Methyl Ethyl Ketone	0.48	1.31	4.15
2-Methyl Hexane	0.00	0.00	0.32
3-Methyl Hexane	0.16	0.00	0.64
Methyl Isobutyl Ketone	2.55	1.31	3.20
Methyl Pentanone	2.55	0.00	0.00
o-Xylene	0.96	0.00	0.00
p,m-Xylene	7.81	1.74	14.8
Propanal	0.00	0.00	7.81
Propanol	0.00	0.00	0.00
Styrene	6.86	1.31	5.74
Tetrachlorethylene	0.48	0.00	10.7
1,3,5-Trimethyl Benzene	0.48	0.00	3.51
1,2,4-Trimethyl Benzene	1.12	0.00	1.43
1,2,3-Trimethyl Benzene	1.12	0.00	2.39
Toluene	13.6	5.51	15.6
Acetaldehyde	0.00	0.00	0.00
Difuro-Furan	0.00	0.00	0.00
Dichloromethane	0.00	0.00	0.00
Ethanol	0.00	0.00	0.00
Methyl Butanol	0.00	0.00	0.00

The table shows that there is some variability between sample sites. This is especially noticeable at sampling Site 2, which generally shows much lower emission rates than the other two sites. Some species predominate in the emissions, for example, acetone, butandiol, ethyl benzene, methyl ethyl ketone, methyl isobutyl ketone, xylene, styrene, tetrachloroethylene and toluene.

3.1.2 One Day After Cover Application - July 24

Cover was applied to the waste material on July 23. Approximately 90% of the pit face was covered. The cover had "cured" to a stable surface by July 24, but it was still wet in spots and the cover appeared to be thin in various locations. It also had a distinct odour. Table 5 presents a description of the cover at the three sampling locations.

Table 5: Description of Sampling Locations on July 24.

Sampling Location	Description
Site 1	- Even grey colour - No surface cracks - Approximately 2 cm. thick
Site 2	- 10% grey, 90% lime green colour - Approximately 5% of surface cracked - Approximately 1.5 cm. thick
Site 3	- 90% grey, 5% green colour - No surface cracks - Approximately 1.5 cm. thick

Table 6 presents the sampling parameters on July 24.

Table 6: Sampling Parameters - July 24

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	0850	1027	1203
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	0924	1057	1235
Sample End (hours)	1024	1200	1335
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ("H_2O)	0.050	0.045	0.040
Waste Temperature (C)	20	23	23
Ambient Temperature (C)	20	21	23
Wind Speed (m/s)	1.8	2.6	1.8
Weather Conditions	Overcast	Overcast	Overcast
Sample Tube Number	F	B	E

Table 7 presents the sampling results for July 24, 1997, one day after cover application. The table shows the emission rate in ng/m²/s for the target compounds at each sampling location.

Table 7: Sampling Results - July 24, 1997.

Target Compound	Emission Rate (ng/m²/s)		
	Site 1	Site 2	Site 3
Acetone	1.28	4.32	6.20
Benzene	0.20	0.36	0.00
1-Butanol	0.20	0.24	0.84
Butanediol	1.48	3.56	0.12
2-Butanol	0.44	0.00	0.40
Butenal	0.00	0.00	0.00
Chlorobenzene	0.00	0.08	0.08
Cyclohexane	0.00	0.00	0.00
Ethyl Benzene	0.20	1.56	0.24
Heptane	0.00	0.00	0.00
Methyl Ethyl Ketone	0.64	1.40	1.92
2-Methyl Hexane	0.00	0.00	0.00
3-Methyl Hexane	0.00	0.00	0.00
Methyl Isobutyl Ketone	0.24	1.76	0.36
Methyl Pentanone	0.00	0.00	0.00
o-Xylene	0.00	0.00	0.00
p-,m-Xylene	0.16	3.96	0.40
Propanal	0.00	0.00	0.00
Propanol	0.00	0.00	0.40
Styrene	0.20	4.44	0.24
Tetrachlorethylene	0.00	0.24	0.28
1,3,5-Trimethyl Benzene	0.00	0.40	0.16
1,2,4-Trimethyl Benzene	0.00	0.12	0.72
1,2,3-Trimethyl Benzene	0.00	0.24	0.20
Toluene	0.60	8.44	0.84
Acetaldehyde	1.08	0.00	0.00
Difuro-Furan	0.00	1.16	0.00
Dichloromethane	0.00	0.00	0.00
Ethanol	0.00	0.00	0.00
Methyl Butanol	0.00	0.00	8.88

The table shows that, similar to the results on July 22, emissions of some species predominate; however, in general, the emissions rates are greatly reduced. Table 8 shows the percent reduction in the emission rates from July 22 to July 24.

Table 8: Percent Reduction In Emission Rates from July 22 to July 24.

Target Compound	Emission Rate Reduction (%)		
	Site 1	Site 2	Site 3
Acetone	89.2	-65.6	57.3
Benzene	74.9	37.9	100.0
1-Butanol	68.6	NA	41.5
Butanediol	73.5	NA	99.4
2-Butanol	NA	NA	79.1
Butenal	100.0	NA	100.0
Chlorobenzene	100.0	NA	83.3
Cyclohexane	100.0	NA	100.0
Ethyl Benzene	95.7	-115.2	94.0
Heptane	NA	NA	100.0
Methyl Ethyl Ketone	-33.8	-7.3	53.7
2-Methyl Hexane	NA	NA	100.0
3-Methyl Hexane	100.0	NA	100.0
Methyl Isobutyl Ketone	90.6	-34.9	88.7
Methyl Pentanone	100.0	NA	NA
o-Xylene	100.0	NA	NA
p-,m-Xylene	98.0	-127.7	97.3
Propanal	NA	NA	100.0
Propanol	NA	NA	NA
Styrene	97.1	-240.3	95.8
Tetrachlorethylene	100.0	NA	88.6
1,3,5-Trimethyl Benzene	100.0	NA	95.4
1,2,4-Trimethyl Benzene	100.0	NA	49.8
1,2,3-Trimethyl Benzene	100.0	NA	91.6
Toluene	95.6	-53.2	94.6
Acetaldehyde	NA	NA	NA
Difuro-Furan	NA	NA	NA
Dichloromethane	NA	NA	OA
Ethanol	NA	NA	NA
Methyl Butanol	NA	NA	NA
Average	**87.5**	**-75.8**	**86.8**

NA: Emission Rate Below Detection Level

The table shows that, on average, the emission rates are reduced by 87.5% at Site 1 and 86.8% at Site 3. However, Site 2 shows some anomalous results, where the emission rates actually increased by 75.8%. The reason for this is unclear, but the surface at Site 2 was found to be different in appearance than at Sites 1 or 3 (i.e., large surface cracks and lime green in colour as opposed to grey at the other locations). It may also be due to the low initial sampling results, which may have been a sampling anomaly.

3.1.3 Two Days After Cover Application - July 25

Table 9 presents the sampling parameters on July 25.

Table 9: Sampling Parameters - July 25.

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	1015	1150	1327
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	1048	1223	1403
Sample End (hours)	1148	1324	1508
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ("H_2O)	0.08	0.06	0.09
Waste Temperature (C)	24	31	36
Ambient Temperature (C)	24	25	28
Wind Speed (m/s)	0.5	1.7	1.6
Weather Conditions	Foggy	Sunny/Hot	Sunny/Hot
Sample Tube Number	E	D	F

The cover cover appeared to be slightly harder and exhibited less odour. Table 10 presents the sampling results for July 25, 1997, two days after cover application. The table shows the emission rate in $ng/m^2/s$ for the target compounds at each sampling location. The internal chamber pressures were found to be higher than recommended by the designer. Correction factors, supplied by the designers, were applied to the emission rates to account for this slight overpressure condition.

Table 10: Sampling Results - July 25, 1997.

Target Compound	Emission Rate (ng/m²/s)		
	Site 1	Site 2	Site 3
Acetone	7.91	4.41	10.03
Benzene	0.70	0.32	0.55
1-Butanol	0.61	0.00	0.99
Butanediol	0.00	1.81	26.12
2-Butanol	0.00	0.00	0.22
Butenal	0.17	0.24	0.00
Chlorobenzene	0.17	0.08	0.33
Cyclohexane	0.00	0.00	0.00
Ethyl Benzene	0.35	1.38	0.55
Heptane	0.00	0.24	0.00
Methyl Ethyl Ketone	0.17	0.20	0.11
2-Methyl Hexane	0.00	0.12	0.00
3-Methyl Hexane	0.00	0.00	0.00
Methyl Isobutyl Ketone	0.87	1.50	1.21
Methyl Pentanone	0.26	1.14	4.96
o-Xylene	0.00	0.00	0.55
p-,m-Xylene	0.44	3.11	1.43
Propanal	0.00	0.00	0.00
Propanol	0.00	0.00	5.29
Styrene	0.44	4.68	0.00
Tetrachlorethylene	0.00	0.51	1.43
1,3,5-Trimethyl Benzene	0.00	0.32	0.00
1,2,4-Trimethyl Benzene	0.00	0.71	0.00
1,2,3-Trimethyl Benzene	0.00	0.39	0.00
Toluene	1.30	7.79	2.75
Acetaldehyde	5.13	0.00	6.50
Difuro-Furan	0.00	0.00	0.00
Dichloromethane	0.00	0.63	0.00
Ethanol	0.00	0.00	7.72
Methyl Butanol	0.00	0.00	0.00

Similar to the previous days sampling results, the emission rates are still greatly reduced compared to the pre-covering results on July 22. Table 11 shows the percent reduction in the emission rates from July 22 to July 25.

Table 11: Percent Reduction In Emission Rates from July 22 to July 25.

Target Compound	Emission Rate Reduction (%)		
	Site 1	Site 2	Site 3
Acetone	32.9	-68.9	76.8
Benzene	12.7	45.7	80.7
1-Butanol	4.6	NA	76.8
Butanediol	99.9	NA	53.5
2-Butanol	NA	NA	96.1
Butenal	63.6	NA	99.9
Chlorobenzene	NA	NA	76.8
Cyclohexane	99.9	NA	99.9
Ethyl Benzene	92.5	-90.0	95.4
Heptane	NA	NA	99.9
Methyl Ethyl Ketone	63.6	84.9	99.1
2-Methyl Hexane	NA	NA	99.9
3-Methyl Hexane	99.9	NA	99.9
Methyl Isobutyl Ketone	65.9	-14.6	87.3
Methyl Pentanone	89.8	NA	NA
o-Xylene	99.9	NA	NA
p-,m-Xylene	94.4	-78.7	96.8
Propanal	NA	NA	99.9
Propanol	NA	NA	NA
Styrene	93.7	-258.9	99.9
Tetrachlorethylene	99.9	NA	95.5
1,3,5-Trimethyl Benzene	99.9	NA	99.9
1,2,4-Trimethyl Benzene	99.9	NA	99.9
1,2,3-Trimethyl Benzene	99.9	NA	99.9
Toluene	95.6	-41.4	94.1
Acetaldehyde	NA	NA	NA
Difuro-Furan	NA	NA	NA
Dichloromethane	NA	NA	NA
Ethanol	NA	NA	NA
Methyl Butanol	NA	NA	NA
Average	**75.3**	**-52.7**	**82.3**

NA: Emission Rate Below Detection Level

The table shows that at Sites 1 and 2, the average reduction in the emission rates has decreased slightly (i.e., 87.5% to 75.3% at Site 1 and 86.8% to 82.3.8% at Site 2. This slight decrease may be due to the fact that any suppression of emissions due to moisture is absent as the waste and cover dries out and the fact that the cover has not yet completely cured, statistical variations in the analysis, or because of additional curing of the cover producing a more impervious surface. Site 2 still shows anomalous results with an increase in the average emission rate; however, the increase was slightly smaller (i.e., 52.7% , down from 75.8%) then was found after first day

(post-cover).

3.1.4 One Week After Cover Application - July 31

Table 12 presents the sampling parameters on July 31.

Table 12: Sampling Parameters - July 31.

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	1020	1155	1328
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	1040	1225	1353
Sample End (hours)	1140	1325	1453
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ("H_2O)	0.04	0.06	0.06
Waste Temperature (C)	31	40	42
Ambient Temperature (C)	23	26	28
Wind Speed (m/s)	1.0	1.7	2.0
Weather Conditions	Sunny	Sunny/Hot	Sunny/Hot
Sample Tube Number	C	D	E

The cover surface was noticeably harder, with very little odour. Also no additional cracking of the surface was evident. Table 13 presents the sampling results for July 31, 1997, one week after cover application. The table shows the emission rate in $ng/m^2/s$ for the target compounds at each sampling location.

Table 13: Sampling Results - July 31, 1997.

Target Compound	Emission Rate (ng/m²/s)		
	Site 1	Site 2	Site 3
Acetone	4.92	5.08	10.92
Benzene	0.40	0.08	2.76
1-Butanol	0.28	0.00	1.96
Butanediol	0.00	0.00	0.00
2-Butanol	0.40	0.00	0.24
Butenal	0.00	0.00	0.52
Chlorobenzene	0.00	0.00	0.00
Cyclohexane	0.00	0.00	0.00
Ethyl Benzene	1.56	0.00	0.12
Heptane	0.00	0.00	0.00
Methyl Ethyl Ketone	2.44	0.00	0.12
2-Methyl Hexane	0.00	0.00	0.00
3-Methyl Hexane	0.00	0.00	0.00
Methyl Isobutyl Ketone	1.20	0.00	0.44
Methyl Pentanone	0.00	0.00	0.00
o-Xylene	0.00	0.00	0.12
p-,m-Xylene	1.56	0.00	0.36
Propanal	0.00	0.00	0.00
Propanol	0.00	0.00	0.00
Styrene	1.56	0.00	0.00
Tetrachlorethylene	0.28	0.08	0.40
1,3,5-Trimethyl Benzene	0.00	0.00	0.00
1,2,4-Trimethyl Benzene	0.00	0.00	0.00
1,2,3-Trimethyl Benzene	0.00	0.00	0.00
Toluene	4.04	0.08	0.84
Acetaldehyde	0.00	0.00	0.00
Difuro-Furan	0.00	0.00	0.00
Dichloromethane	0.76	2.52	0.00
Ethanol	0.00	0.00	0.00
Methyl Butanol	7.60	0.00	0.16

The results show that, although the cover surface had appeared to have undergone additional curing, the emission rates have increased for the majority of compounds compared to the measurements conducted a week ago on July 25. However, emissions from Site 2 have significantly decreased. This is also evident in Table 14, which shows the percent reduction in the emission rates from July 22 to July 31.

Table 14: Percent Reduction In Emission Rates from July 22 to July 31.

Target Compound	Emission Rate Reduction (%)		
	Site 1	Site 2	Site 3
Acetone	58.3	-94.7	24.7
Benzene	49.8	86.2	-188.5
1-Butanol	56.1	NA	-36.6
Butanediol	73.5	NA	99.9
2-Butanol	NA	NA	87.5
Butenal	99.9	NA	-8.7
Chlorobenzene	99.9	NA	99.9
Cyclohexane	99.9	NA	99.9
Ethyl Benzene	66.3	99.9	97.0
Heptane	NA	NA	99.9
Methyl Ethyl Ketone	-410.1	99.9	97.1
2-Methyl Hexane	NA	NA	99.9
3-Methyl Hexane	99.9	NA	99.9
Methyl Isobutyl Ketone	53.0	99.9	86.2
Methyl Pentanone	99.9	NA	NA
o-Xylene	99.9	NA	NA
p-,m-Xylene	80.0	99.9	97.6
Propanal	NA	NA	99.9
Propanol	NA	NA	NA
Styrene	77.2	99.9	99.9
Tetrachlorethylene	41.5	NA	96.3
1,3,5-Trimethyl Benzene	99.9	NA	99.9
1,2,4-Trimethyl Benzene	99.9	NA	99.9
1,2,3-Trimethyl Benzene	99.9	NA	99.9
Toluene	70.2	98.5	94.6
Acetaldehyde	NA	NA	NA
Difuro-Furan	NA	NA	NA
Dichloromethane	NA	NA	NA
Ethanol	NA	NA	NA
Methyl Butanol	NA	NA	NA
Average	**55.7**	**73.7**	**70.3**

NA: Emission Rate Below Detection Level

The table shows that the average reduction in the emission rate has changed from 75.3% on July 25 to 55.7% on July 31 at Site 1. Similarly, at Site 3, the average emission rate has changed from 82.3% on July 25 to 70.3% on July 31. However, the emission rate at Site 2 is now comparable to the other sites with an emission rate reduction, compared to the initial measurements on July 22 of 73.7%. The reason for the slight increase in the emissions at Sites 2 and 3 is unclear. There was no indication from observation of the cover surface that deterioration had taken place. In fact, the surface was found to be harder and looked more likely to be less permeable. Therefore, the

difference may be due to just statistical variation in the analysis from sample to sample. There is also no explanation in the results from Site 2, as again there was no evidence of change in the cover surface at this location.

3.1.5 Two Weeks After Cover Application - August 7

Table 15 presents the sampling parameters on August 7.

Table 15: Sampling Parameters - August 7.

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	0910	1122	1303
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	1020	1153	1344
Sample End (hours)	1120	1301	1444
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ($"H_2O$)	0.02	0.04	0.03
Waste Temperature (C)	22	30	30
Ambient Temperature (C)	24	26	26
Wind Speed (m/s)	1.5	2.5	2.0
Weather Conditions	Sunny	Sunny/Hot	Sunny/Hot
Sample Tube Number	B	D	F

There was little change in the cover surface from that observed on July 31. A few cracks had appeared, but they were relatively small. Table 16 presents the sampling results for August 7, two weeks after cover application. The table shows the emission rate in $ng/m^2/s$ for the target compounds at each sampling location.

Table 16: Sampling Results - August 7.

Target Compound	Emission Rate (ng/m²/s)		
	Site 1	Site 2	Site 3
Acetone	1.84	6.60	6.04
Benzene	0.12	0.00	0.20
1-Butanol	0.12	0.00	0.20
Butanediol	0.00	0.00	0.00
2-Butanol	0.00	0.36	0.56
Butenal	0.00	0.00	0.00
Chlorobenzene	0.00	0.00	0.00
Cyclohexane	0.00	0.00	0.00
Ethyl Benzene	0.52	2.36	0.20
Heptane	0.00	0.32	0.00
Methyl Ethyl Ketone	0.76	0.00	2.32
2-Methyl Hexane	0.00	0.00	0.00
3-Methyl Hexane	0.00	0.00	0.00
Methyl Isobutyl Ketone	0.44	2.20	0.44
Methyl Pentanone	0.00	0.00	0.00
o-Xylene	0.00	0.00	0.20
p-,m-Xylene	0.60	5.32	0.68
Propanal	0.00	0.00	0.00
Propanol	0.00	0.00	0.00
Styrene	0.36	4.84	0.00
Tetrachlorethylene	0.16	0.68	0.64
1,3,5-Trimethyl Benzene	0.00	0.56	0.00
1,2,4-Trimethyl Benzene	0.00	0.48	0.00
1,2,3-Trimethyl Benzene	0.00	0.00	0.00
Toluene	2.40	10.12	1.68
Acetaldehyde	0.00	0.00	0.00
Difuro-Furan	0.00	0.00	0.00
Dichloromethane	0.32	1.36	0.00
Ethanol	0.00	0.00	0.00
Methyl Butanol	1.04	5.40	1.64

The emission rates in Table 16 are similar to the emission rates measured on July 24 and 25. Therefore it appears that the results on July 31 may have been an anomaly. This is evident in Table 17, which shows the percent reduction in the emission rates from July 22 to August 7.

Table 17: Percent Reduction In Emission Rates from July 22 to August 7.

Target Compound	Emission Rate Reduction (%)		
	Site 1	Site 2	Site 3
Acetone	84.9	[illegible]	[illegible]
Benzene	84.9	99.9	79.1
1-Butanol	81.2	NA	86.1
Butanediol	99.9	NA	99.9
2-Butanol	NA	NA	70.7
Butenal	99.9	NA	99.9
Chlorobenzene	99.9	NA	99.9
Cyclohexane	99.9	NA	99.9
Ethyl Benzene	88.8	-225.6	95.0
Heptane	NA	NA	99.9
Methyl Ethyl Ketone	-58.9	99.9	44.0
2-Methyl Hexane	NA	NA	99.9
3-Methyl Hexane	99.9	NA	99.9
Methyl Isobutyl Ketone	82.8	-68.6	86.2
Methyl Pentanone	99.9	NA	NA
o-Xylene	99.9	NA	NA
p-,m-Xylene	92.3	-205.9	95.4
Propanal	NA	NA	99.9
Propanol	NA	NA	NA
Styrene	94.7	-271.0	99.9
Tetrachlorethylene	66.6	NA	94.0
1,3,5-Trimethyl Benzene	99.9	NA	99.9
1,2,4-Trimethyl Benzene	99.9	NA	99.9
1,2,3-Trimethyl Benzene	99.9	NA	99.9
Toluene	82.3	-83.7	89.2
Acetaldehyde	NA	NA	NA
Difuro-Furan	NA	NA	NA
Dichloromethane	NA	NA	NA
Ethanol	NA	NA	NA
Methyl Butanol	NA	NA	NA
Average	**84.9**	**-101.0**	**90.8**

NA: Emission Rate Below Detection Level

The table shows that the average reduction in the emission rate is similar to the reductions measured on July 24 and 25. The average emission rate reduction at Site 1 was 84.9%, compared to 87.5% on July 24, 88.3% on July 25 and 55.7% on August 7. At Site 3, the average emission rate reduction was 90.8%, compared to 86.8% on July 24, 92.2% on July 25 and 70.3% on July 31. However, the average emission rate at Site 2 is again showing an increase compared to the original measurements on July 22. Therefore, it appears that the measurements conducted on July 31 were anomalous.

3.1.6 Three Weeks After Cover Application - August 14

Table 18 presents the sampling parameters on August 14.

Table 18: Sampling Parameters - August 14.

Parameter	Site 1	Site 2	Site 3
Purge Start (hours)	1030	1225	1400
Sweep Rate (l/min)	17.2	17.2	17.2
Sample Start (hours)	1122	1256	1344
Sample End (hours)	1222	1356	1444
Sample Flow Rate (ml/min)	300	300	300
Internal Pressure ("H_2O)	0.025	0.05	0.045
Waste Temperature (C)	24	29	30
Ambient Temperature (C)	25	25	26
Wind Speed (m/s)	2.5	2.7	2.5
Weather Conditions	Sunny	Sunny/Hot	Sunny/Hot
Sample Tube Number	D	E	F

Similar to the observations made on August 7, there was little change in the cover surface. Table 19 presents the sampling results for August 14, three weeks after cover application. The table shows the emission rate in $ng/m^2/s$ for the target compounds at each sampling location.

Table 19: Sampling Results - August 14.

Target Compound	Emission Rate ($ng/m^2/s$)		
	Site 1	Site 2	Site 3
Acetone	0.36	3.12	4.76
Benzene	0.08	0.36	0.16
1-Butanol	0.00	0.00	0.28
Butanediol	0.00	0.00	0.00
2-Butanol	0.20	0.00	1.24
Butenal	0.00	0.68	0.20
Chlorobenzene	0.00	0.00	0.00
Cyclohexane	0.00	0.00	0.00
Ethyl Benzene	0.04	1.84	0.08
Heptane	0.00	0.00	0.00
Methyl Ethyl Ketone	0.20	0.96	2.16
2-Methyl Hexane	0.00	0.00	0.00
3-Methyl Hexane	0.00	0.00	0.00
Methyl Isobutyl Ketone	0.16	1.08	0.32
Methyl Pentanone	0.00	0.00	0.00
o-Xylene	0.00	0.00	0.00
p-,m-Xylene	0.08	3.16	0.16
Propanal	0.00	0.00	0.00
Propanol	0.00	0.00	0.00
Styrene	0.00	2.88	0.08
Tetrachlorethylene	0.00	0.28	0.00
1,3,5-Trimethyl Benzene	0.00	0.00	0.00
1,2,4-Trimethyl Benzene	0.00	0.00	0.00
1,2,3-Trimethyl Benzene	0.00	0.00	0.00
Toluene	0.20	7.20	0.48
Acetaldehyde	0.00	0.00	0.00
Difuro-Furan	0.00	0.00	0.00
Dichloromethane	0.00	1.12	0.00
Ethanol	0.00	0.00	0.00
Methyl Butanol	0.36	4.84	12.96

The emission rates in Table 19 are similar to the emission rates measured the previous week on August 7. In fact, with the exception of methyl butanol at Site 3, the emission rates are all slightly lower. This is also shown in Table 20, which presents the percent reduction in the emission rates from July 22 to August 17.

Table 20: Percent Reduction In Emission Rates from July 22 to August 14.

Target Compound	Emission Rate Reduction (%)		
	Site 1	Site 2	Site 3
Acetone	96.9	-19.6	67.2
Benzene	90.0	37.9	83.3
1-Butanol	99.9	NA	80.5
Butanediol	99.9	NA	99.9
2-Butanol	NA	NA	35.2
Butenal	99.9	NA	58.2
Chlorobenzene	99.9	NA	99.9
Cyclohexane	99.9	NA	99.9
Ethyl Benzene	99.1	-153.9	98.0
Heptane	NA	NA	99.9
Methyl Ethyl Ketone	58.2	26.4	47.9
2-Methyl Hexane	NA	NA	99.9
3-Methyl Hexane	99.9	NA	99.9
Methyl Isobutyl Ketone	93.7	17.2	90.0
Methyl Pentanone	99.9	NA	NA
o-Xylene	99.9	NA	NA
p-,m-Xylene	99.0	-81.7	98.9
Propanal	NA	NA	99.9
Propanol	NA	NA	NA
Styrene	99.9	-120.8	98.6
Tetrachlorethylene	99.9	NA	99.9
1,3,5-Trimethyl Benzene	99.9	NA	99.9
1,2,4-Trimethyl Benzene	99.9	NA	99.9
1,2,3-Trimethyl Benzene	99.9	NA	99.9
Toluene	98.5	-30.7	96.9
Acetaldehyde	NA	NA	NA
Difuro-Furan	NA	NA	NA
Dichloromethane	NA	NA	NA
Ethanol	NA	NA	NA
Methyl Butanol	NA	NA	NA
Average	**96.7**	**-40.6**	**88.8**
NA: Emission Rate Below Detection Level			

The table shows similar results to the previous weeks measurements at Sites 1 and 3. There was a slight improvement at Site 1 where the average reduction increased from 84.9% to 96.7%. At Site 2 the average reduction dropped from 90.8 % to 88.8%, primarily due to the increased emissions of methyl butanol. Site 2 showed the similar emissions increase compared to the initial measurements on July 22.

3.2 Summary of Results

Table 21 presents a summary of the percent reduction in emissions for selected compounds during all five sampling periods. Compounds that were not detected during any of the sampling periods (e.g., dichloromethane, ethanol, etc.) were omitted from the table. Summary results for Site 2 have not been presented due to the anomalous nature of the data. It is suspected that the anomalous results from Site 2 were due to either poor application of cover at this location (see Table 5, Section 3.1.2) or a chemical reaction between the cover and the waste.

Table 21: Summary of Percent Reduction in Emissions of Target Compounds After Cover Application.

Target Compound	Site 1	Site 3	Site 1	Site 3	Site 1	Site 3	Site 1	Site 3	Site 1	Site 3
	Period After Cover Application									
	1 Day (July 24)		2 Days (July 25)		1 Week (July 31)		2 Weeks (Aug. 7)		3 Weeks (Aug. 14)	
Acetone	89.2	57.3	69.1	76.8	58.3	24.7	84.4	58.4	96.9	67.2
Benzene	74.9	100	59.9	80.7	49.8	-188.5	84.9	79.1	90.0	83.3
1-Butanol	68.6	41.5	56.1	76.8	56.1	-36.6	81.2	86.1	99.9	80.5
Butanediol	73.5	99.4	99.9	53.5	73.5	99.9	99.9	99.9	99.9	99.9
2-Butanol	NA	79.1	NA	96.1	NA	87.5	NA	70.7	NA	35.2
Butanal	100	NA	83.3	99.9	99.9	-8.7	99.9	99.9	99.9	58.2
Chlorobenzene	100	NA	49.8	76.8	99.9	99.9	99.9	99.9	99.9	99.9
Cyclohexane	100	100	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
Ethyl Benzene	95.7	94.0	96.5	95.4	66.3	97.0	88.8	95.0	99.1	98.0
Heptane	NA	100	NA	99.9	NA	99.9	NA	99.9	NA	99.9
Methyl Ethyl Ketone	-33.8	53.7	83.3	99.1	-410.1	97.1	-58.9	44.0	58.2	47.9
2-Methyl Hexane	NA	100	NA	99.9	NA	99.9	NA	99.9	NA	99.9
3-Methyl Hexane	100	100	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
Methyl Isobutyl Ketone	90.6	88.7	84.3	87.3	53.0	82.2	82.8	86.2	93.7	90.0
Methyl Pentanone	99.9	NA	95.3	NA	99.9	NA	99.9	NA	99.9	NA
o-Xylene	100	NA	99.9	NA	99.9	NA	99.9	NA	99.9	NA
m & p-Xylene	98.0	97.3	97.4	96.8	80.0	97.6	92.3	95.4	99.9	98.9
Propanal	NA	99.9	NA	99.9	NA	99.9	NA	99.9	NA	99.9
Styrene	97.1	95.8	97.1	99.9	77.2	99.9	94.7	99.9	99.9	98.6
Tetrachlorethylene	100	97.4	99.9	95.5	41.5	96.3	66.6	94.0	99.9	99.9
1,3,5-Trimethyl Benzene	100	95.4	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
1,2,4-Trimethyl Benzene	100	49.8	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
1,2,3-Trimethyl Benzene	100	91.6	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
Toluene	95.6	94.6	95.6	94.1	70.2	94.6	82.3	89.2	98.5	96.9
Maximum Reduction (%)	100	100	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
Minimum Reduction (%)	-33.8	41.5	69.1	53.5	-410.1	-188.5	-58.9	44.0	58.2	35.2
Average Reduction (%)	87.5	86.8	84.9	92.2	55.7	70.3	84.9	90.8	96.7	88.8

The summary table shows that, for the two sites considered, over the 21-day study period, the average emission reduction ranged from 88.8 and 96.7 %. The effectiveness is slightly less for some of the more volatile species (e.g., acetone), where the emission reduction was more variable. However, this may be due to sampling artifacts other than actual variations in the effectiveness of the cover. Figures 3 and 4 show the emission rates for four select compounds; acetone, m&p-xylene, styrene and toluene, at Sites 1 and 3, respectively, over the 21-day sampling period. The emission rates were lowest immediately after the Posi-Shell was applied. By Day 2, (post-cover),

the emissions had generally increased, but a steady reduction was found in emissions over the next 3 weeks at Site 1. The findings were similar at Site 3 however, there was slightly more variability for some of the select compounds. The figures clearly show an overall reduction in emission rates over the study period particularly after the cover material had the opportunity to cure. Therefore, it appears that, during the 21-day period of this study, the Posi-Shell cover material appeared to be an effective barrier, reducing airborne emissions from the stored waste.

4. CONCLUSIONS

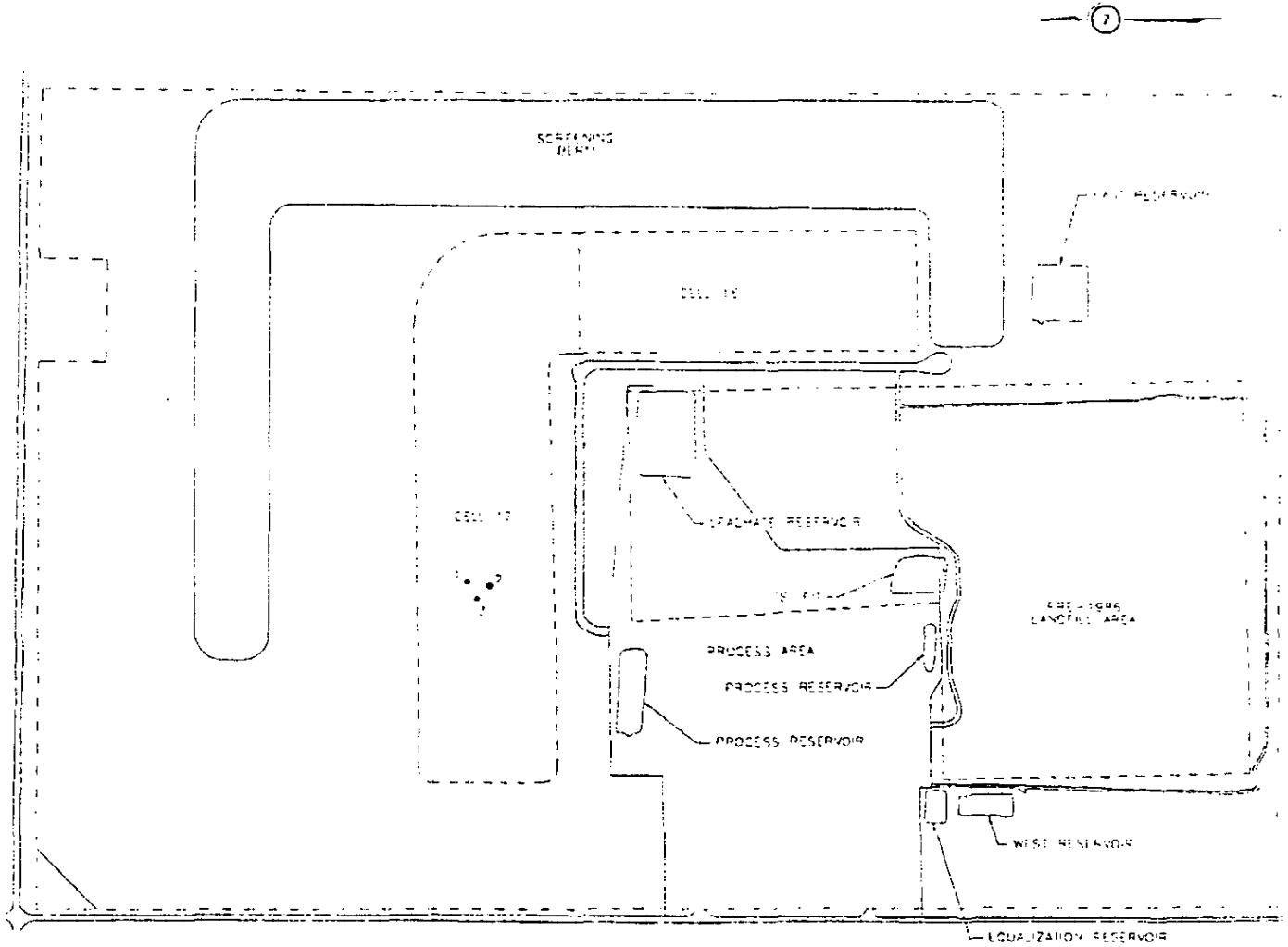
RWDI performed an assessment of a cover application material called Posi-Shell to reduce air emissions of volatile organic compounds, aldehydes, ketones and alcohols from the exposed waste at Laidlaw's Corunna Facility. The study involved sampling the emissions of target compounds from the pit face using an isolation flux chamber. Three sample positions were studied.

The results indicated that, over the 21-day study period, emissions of the target compounds from the two sites at the pit face were reduced by about 89 to 97%. Anomalous findings were encountered at the second location which appeared to be related to a chemical reaction with the waste that may have changed the binding characteristics of the Posi-Shell. With minor exceptions, the cover appeared to form a resilient surface, free from major cracks, after curing. When properly applied, the cover application was demonstrated to be an effective cover material, capable of dramatically reducing emissions for the target compounds.

5. REFERENCES

1. Fax transmittal from Mr. Blake Nesbitt, Laidlaw Environmental Services, to Mr. David Chadder, RWDI on July 15, 1997.

2. Reinhart, D. R., D. C. Cooper and B. L. Walker. 1992. **"Flux Chamber Design and Operation for the Measurement of Solid Waste Landfill Gas Emission Rates"**. Journal of Air and Waste Management Association. 42:1067-70.



Flux Chamber Sample Locations	Drawn by: SML	Figure 1	RWDI
	Scale: Approx. 1:7,000		
Laidlaw Cover Application - Corunna, Ontario Job No 97-411	Date: Oct. 30,1997		

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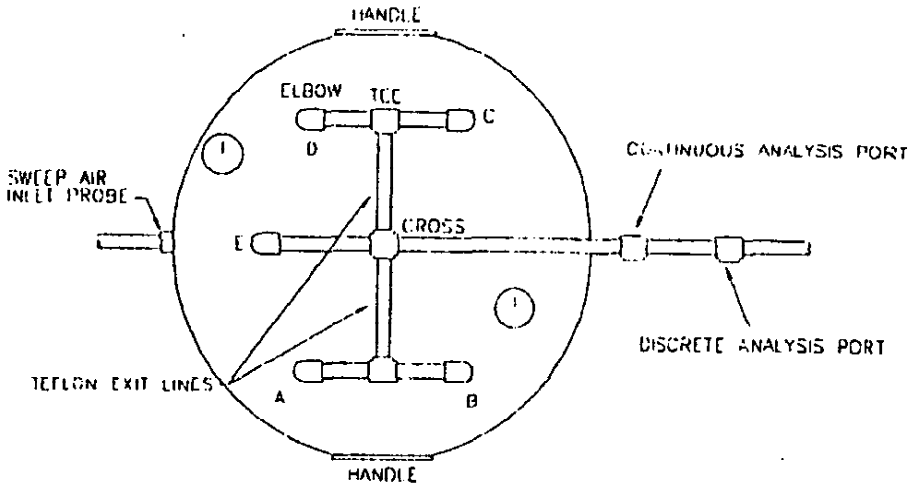
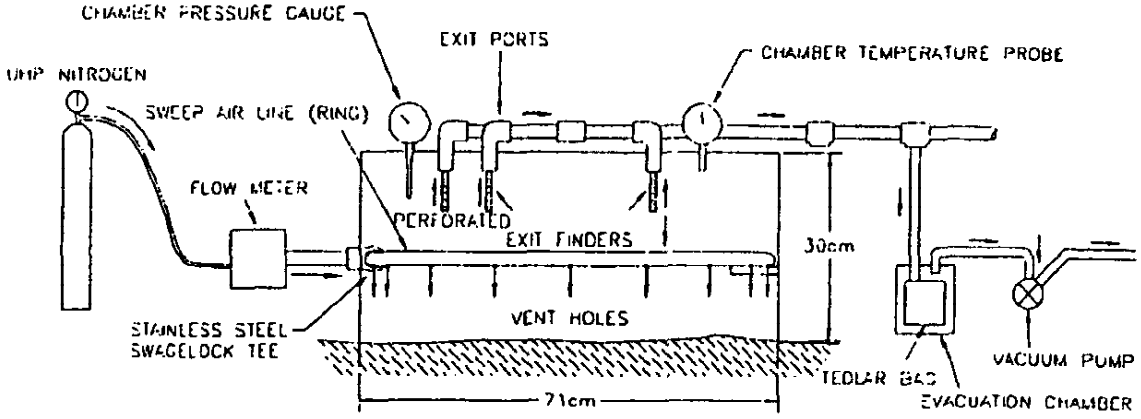
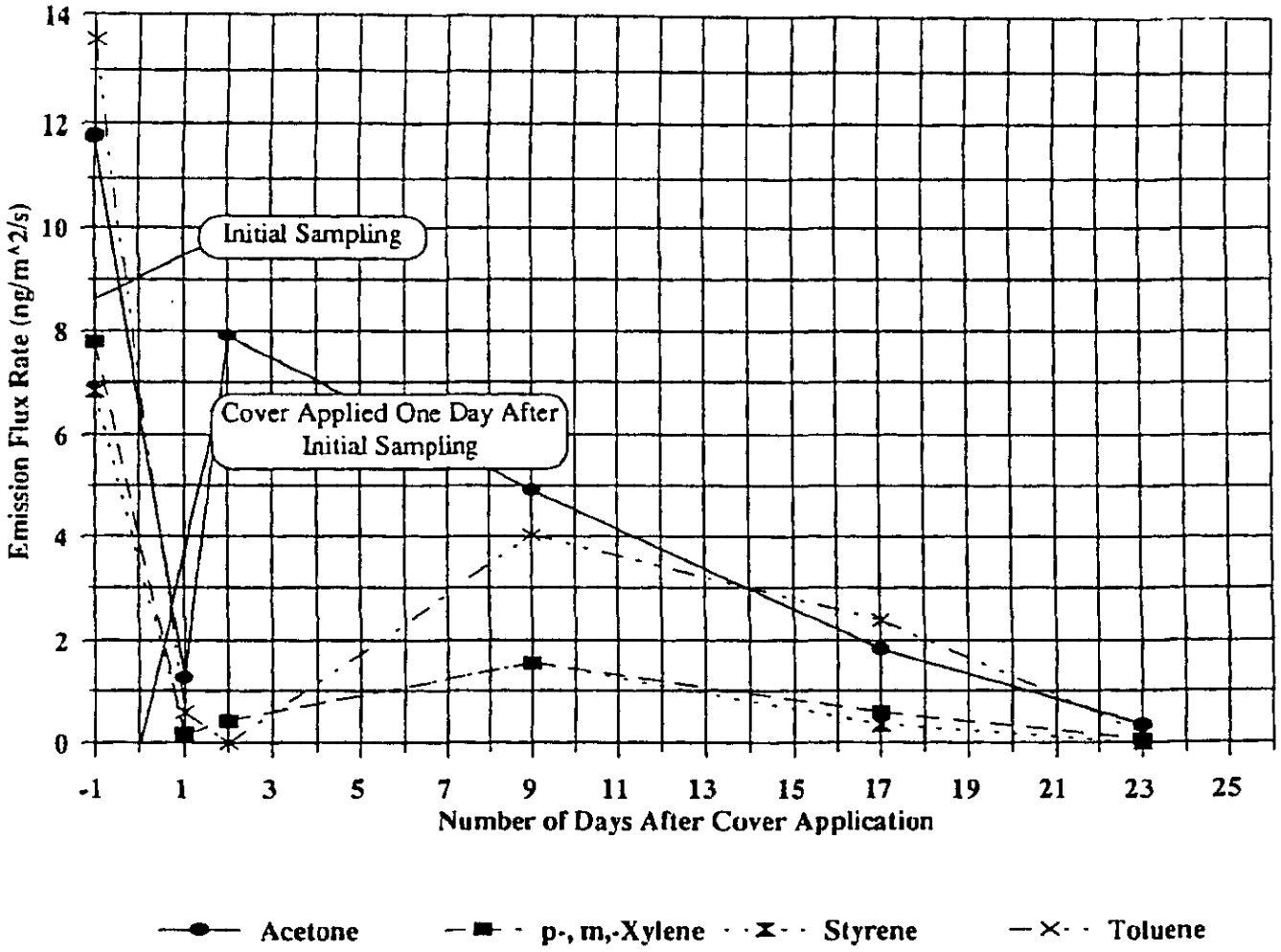


Top View



Side View

Schematic Drawing Flux Chamber Sampling Assembly	Drawn by: SML	Figure: 2	RWDI
	Scale:	N.T.S.	
Laidlaw Cover Application - Corunna, Ontario Job No. 97-411	Date:	Oct. 29,1997	



Emission Flux Rates for Select Compounds - Site 1	Figure: 3	RWDI
Laidlaw Cover Application - Corunna, Ontario Job No. 97-411	Date: Oct. 30,1997	

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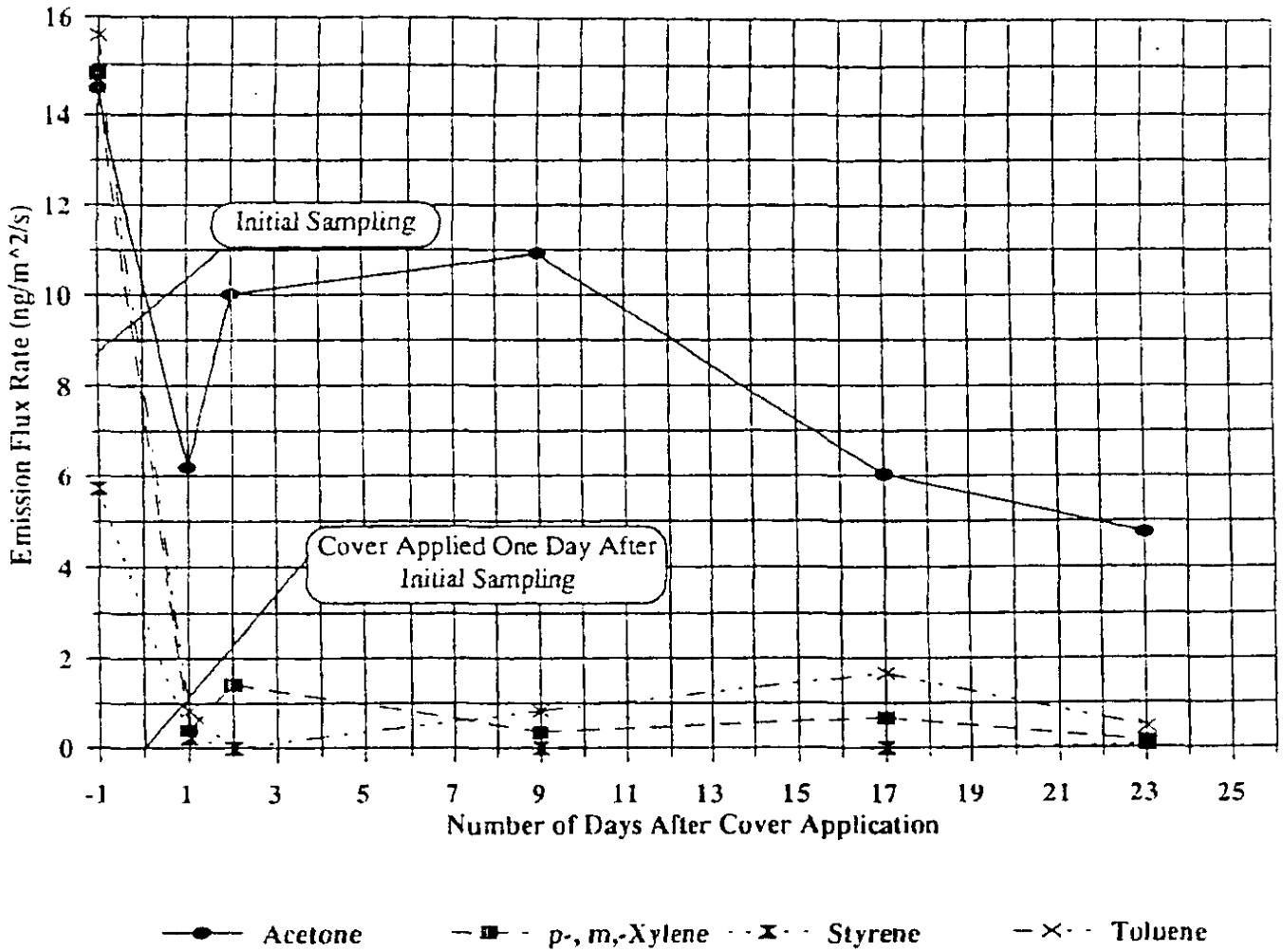

Emission Flux Rates for Select Compounds - Site 3	Figure: 4	RWDI
Laidlaw Cover Application - Corunna, Ontario Job No. 97-411	Date: Oct. 30,1997	

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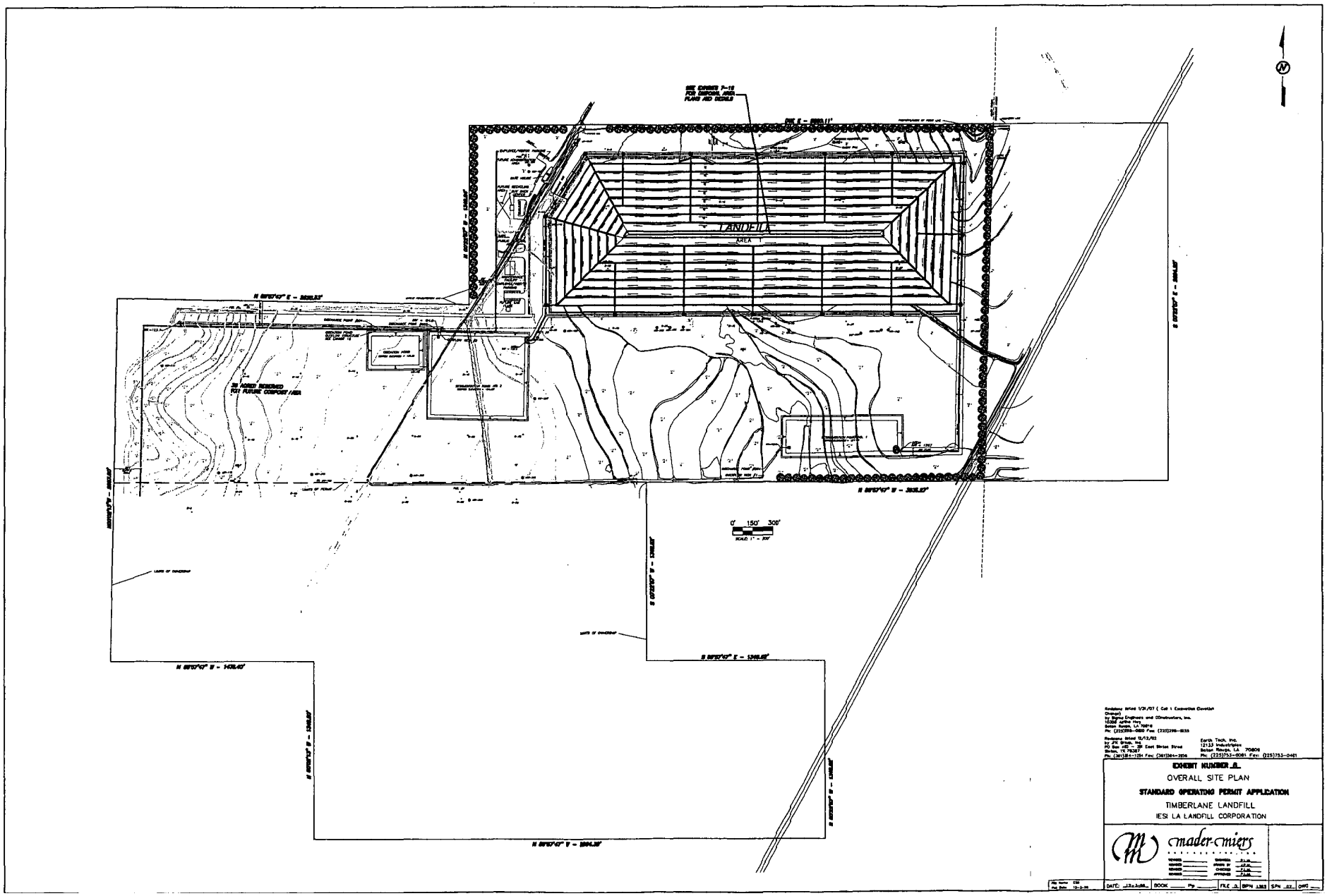

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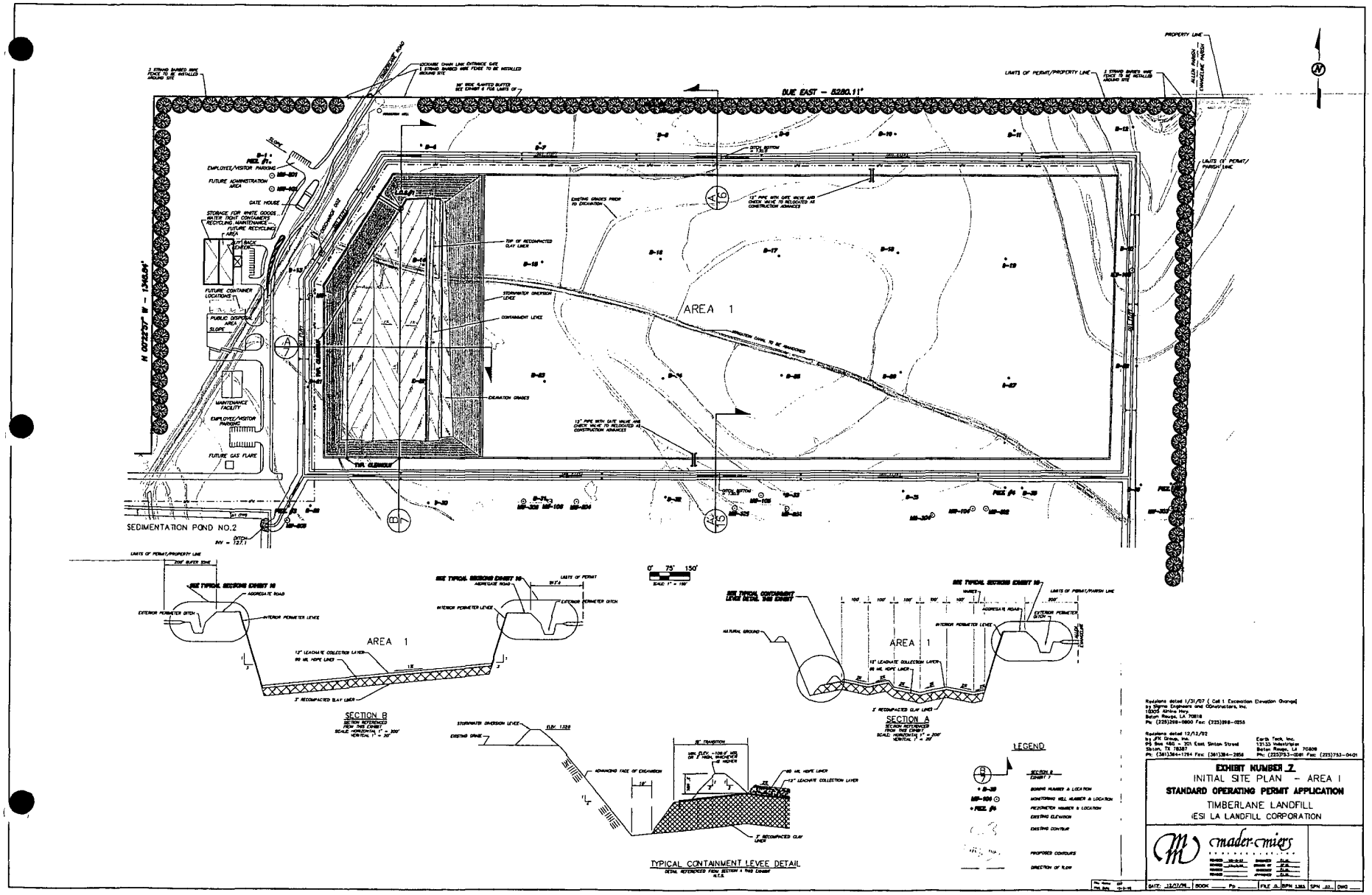
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FUTURE CONTAINER LOCATIONS
PUBLIC DISPOSAL AREA
MAINTENANCE FACILITY
FUTURE GAS FLARE
SECTION B
SECTION A
TYPICAL CONTAINMENT LEVEE DETAIL
LEGEND
EXHIBIT NUMBER 7
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STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
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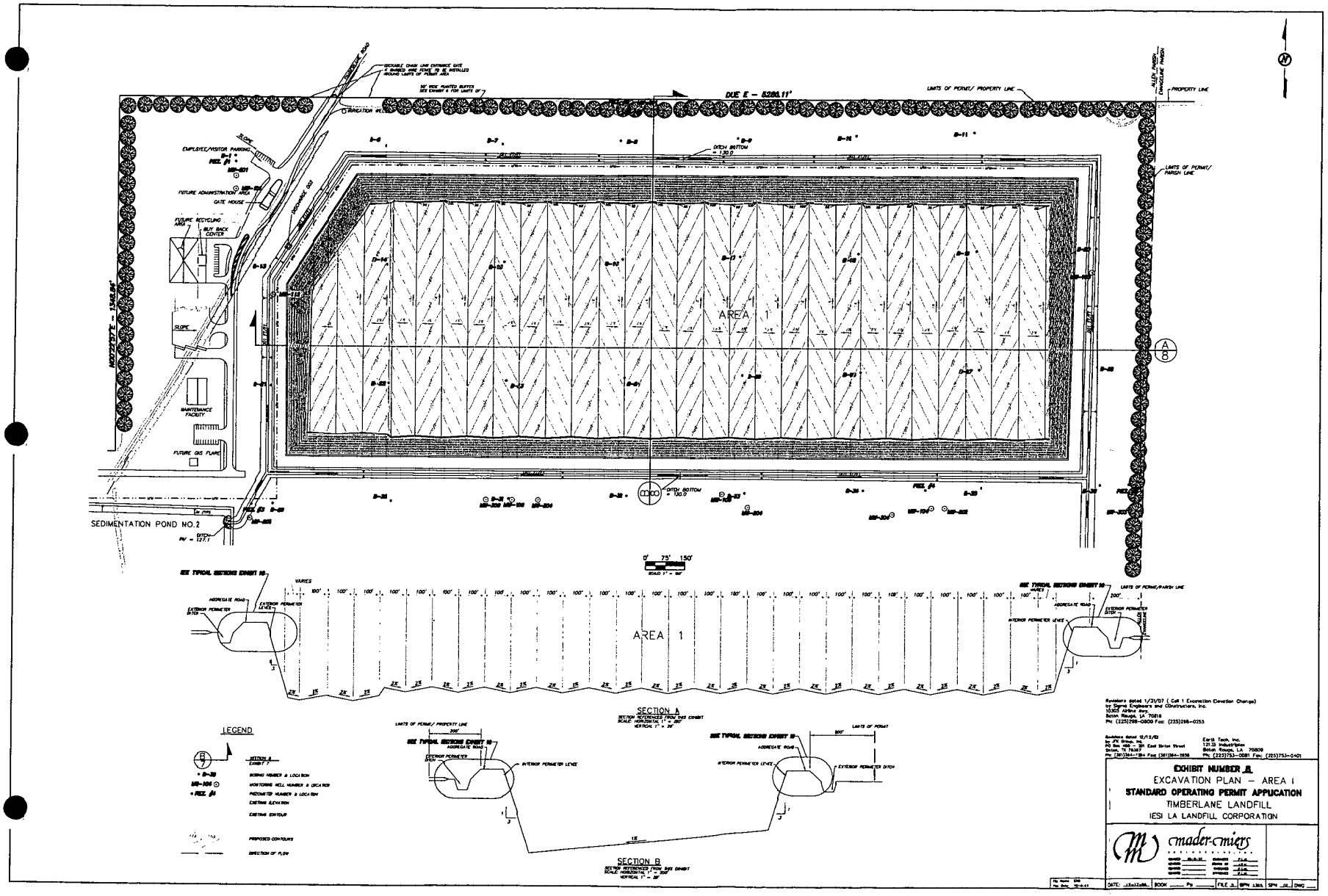

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
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1213 Industrious
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 8

EXCAVATION PLAN – AREA 1

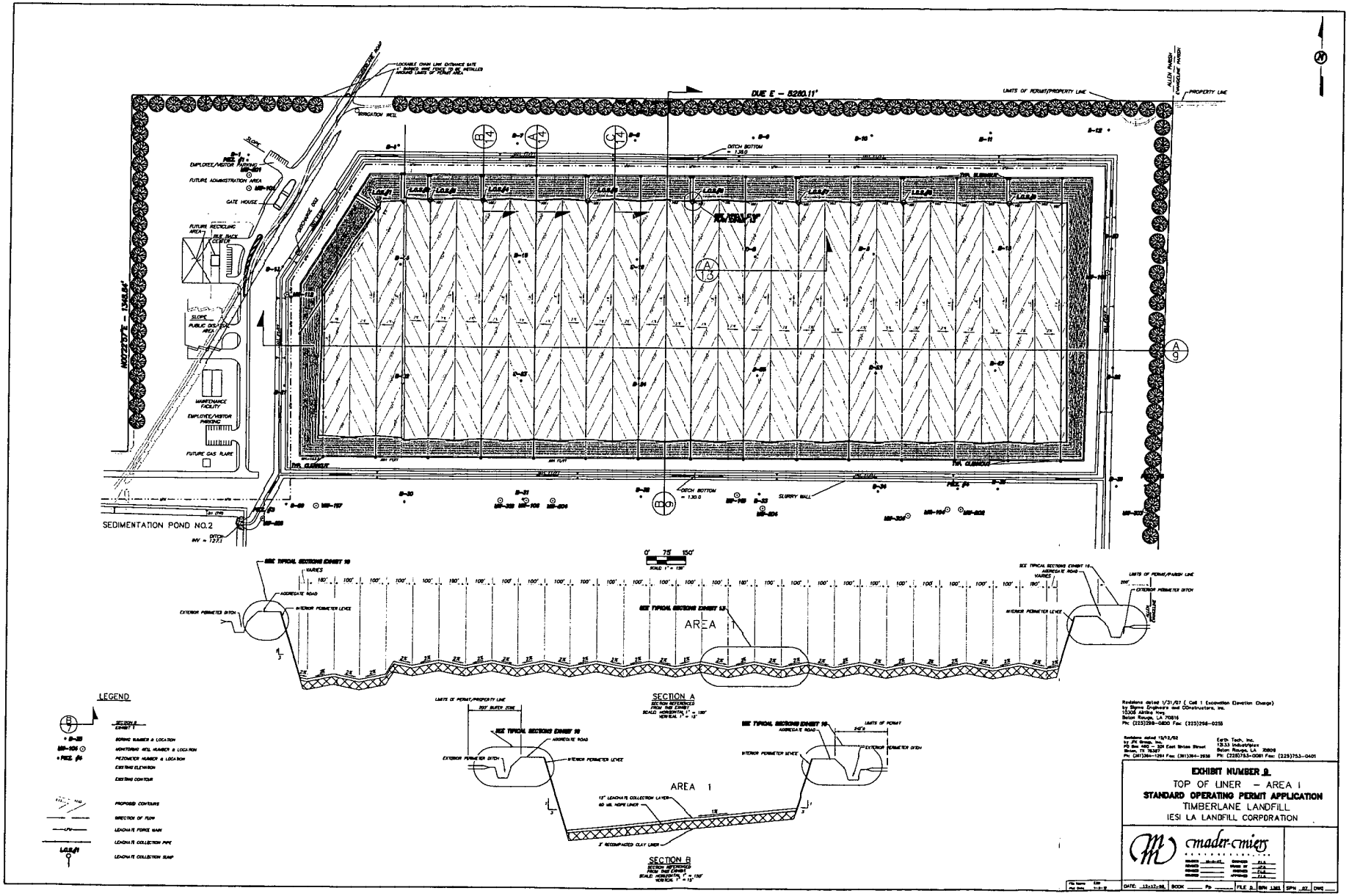
STANDARD OPERATING PERMIT APPLICATION

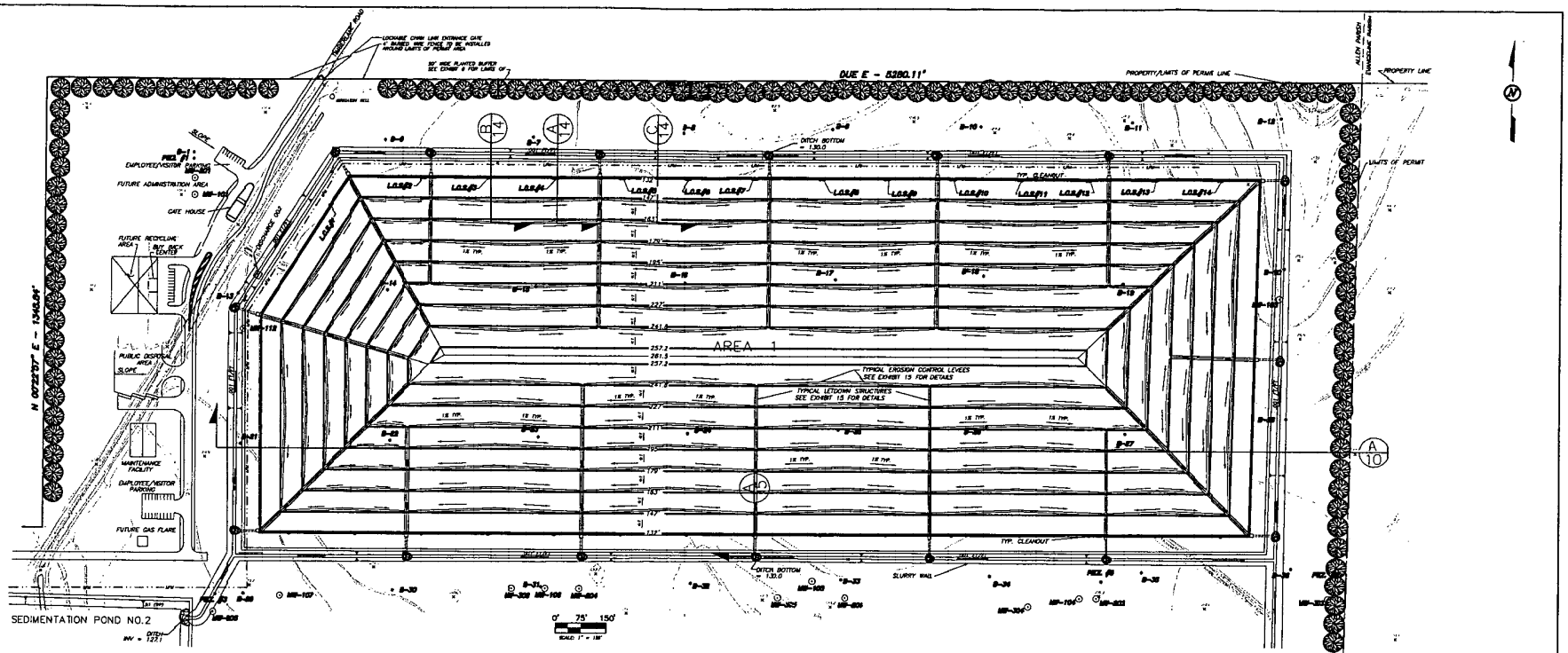
TIMBERLANE LANDFILL

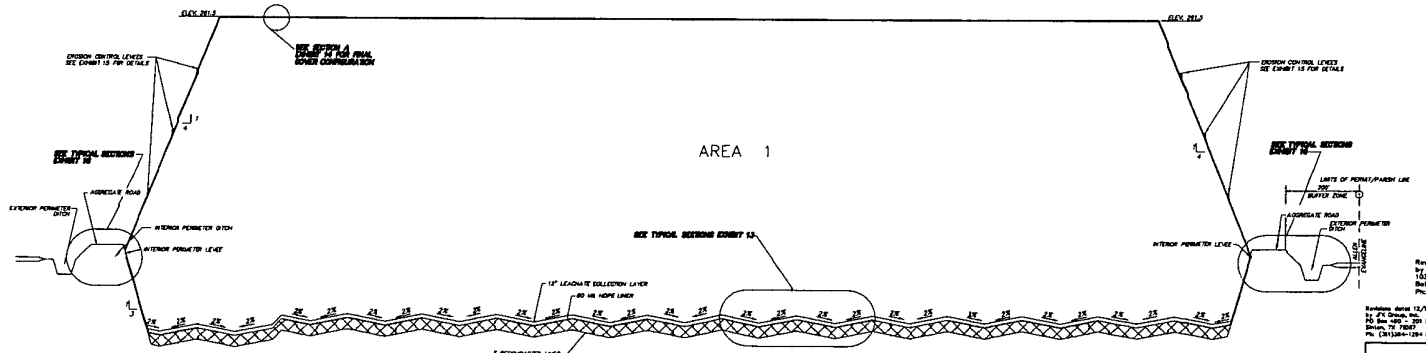
IESI LA LANDFILL CORPORATION

cmader-cmiers

DATE: 12/12/06 | BOOK ___ Pg ___ | FILE 3 | SPN 1365 | SPN ___ | DWG ___


DUE E – 5280.11'
LIMITS OF PERMIT/PROPERTY LINE
PROPERTY LINE
ALLEN PARISH
CONSOLIDATE PARISH
IRRIGATION WELL
LOCKABLE CHAIN LINK ENTRANCE GATE, SIGNED, AND POSTS TO BE METALLIC MARKING LIMITS OF PERMIT AREA
EMPLOYEE/VISITOR PARKING
FUTURE ADMINISTRATION AREA
GATE HOUSE
FUTURE RECYCLING AREA
BUY BACK CENTER
SLOPE
PUBLIC DISPOSAL AREA
MAINTENANCE FACILITY
EMPLOYEE/VISITOR PARKING
FUTURE GAS FLARE
NORTH – 1,906.84'
DITCH BOTTOM = 130.0
SLURRY WALL
SEDIMENTATION POND NO.2
DITCH INV = 127.1
SEE TYPICAL SECTIONS EXHIBIT 10
AGGREGATE ROAD
INTERIOR PERIMETER LEVEE
EXTERIOR PERIMETER DITCH
SEE TYPICAL SECTIONS EXHIBIT 13
AREA 1
SCALE 1" = 150'
SECTION A
SEE SUM REFERENCED FROM THIS EXHIBIT
SCALE HORIZONTAL 1" = 150' VERTICAL 1" = 15'
LIMITS OF PERMIT/PROPERTY LINE
100' BUFFER ZONE
LIMITS OF PERMIT
13" LEACHATE COLLECTION LAYER
60 MIL HDPE LINER
3' RECOMPACTED CLAY LINER
SECTION B
SECTION REFERENCED FROM THIS EXHIBIT
SCALE HORIZONTAL 1" = 150' VERTICAL 1" = 15'
LEGEND
SECTION & EXHIBIT 1
BORING NUMBER & LOCATION
MONITORING WELL NUMBER & LOCATION
PIEZOMETER NUMBER & LOCATION
EXISTING ELEVATION
EXISTING CONTOUR
PROPOSED CONTOURS
DIRECTION OF FLOW
LEACHATE FORCE MAIN
LEACHATE COLLECTION PIPE
LEACHATE COLLECTION SUMP
Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change) by Sigma Engineers and Constructors, Inc. 10305 Airline Hwy Baton Rouge, LA 70816 Ph: (225)298-0800 Fax: (225)298-0255
Revisions dated 12/13/02 by JF & Associates, Inc. 16 Bay Tree Ln. 1234 East Union Street Slidell, LA 70460 Ph: (985)384-1294 Fax: (985)384-2938
Earth Tech, Inc. 12111 Industriplex Blvd. Baton Rouge, LA 70809 Ph: (225)753-0081 Fax: (225)753-0401
EXHIBIT NUMBER 9
TOP OF LINER – AREA 1
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION
mader-miers
DATE: 12-12-98 BOOK Pg FILE 9 SPN 1101 SPN .02 DWG





SECTION A
SECTION REFERENCED FROM 3rd EXHIBIT
SCALE: HORIZONTAL 1" = 150'
VERTICAL 1" = 15'

LEGEND

B / 14	SECTION & EXHIBIT #
• B-35	BORING NUMBER & LOCATION
MW-106	MONITORING WELL NUMBER & LOCATION
• PIEZ. #4	PIEZOMETER NUMBER & LOCATION
21'	EXISTING ELEVATION
	EXISTING CONTOUR
	PROPOSED CONTOURS
	DIRECTION OF FLOW
—LFM—	LEACHATE FORCE MAIN
—195—	PROPOSED FINAL CONTOURS

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Constructors, Inc.
10005 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/12/02
by J.V. Group, Inc.
PO Box 4202 - 201 East Baton Street
Baton, TX 77837
Ph: (361)364-1284 Fax: (361)364-2656

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 10

FINAL CONTOURS - AREA I

STANDARD OPERATING PERMIT APPLICATION

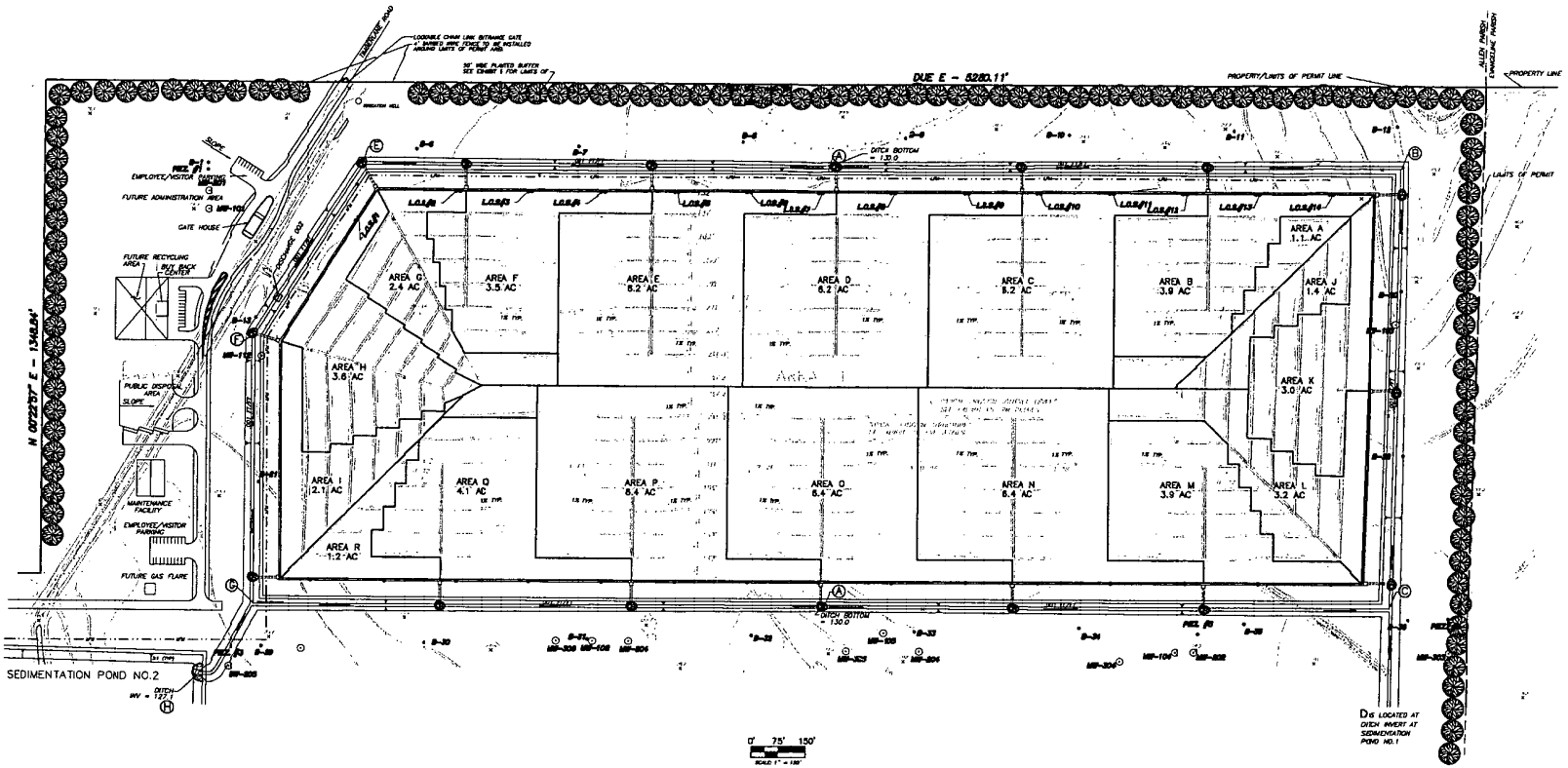
TIMBERLANE LANDFILL

IESI LA LANDFILL CORPORATION

mader-miers

REVISED	01-31-07	DESIGNED	P.J.M.
REVISED		DRAWN BY	J.R.W.
REVISED		CHECKED	J.R.W.
REVISED		REVIEWED	P.J.M.
REVISED		APPROVED	P.J.M.

DATE: 12-17-96 | BOOK ___ Pg ___ | FILE 2 | SPN 1381 | SPN 37 | DWG ___



LEGEND

• B-32	BORING NUMBER & LOCATION
MW-104 ⊙	MONITORING WELL NUMBER & LOCATION
• PIEZ. P	PIEZOMETER NUMBER & LOCATION
127	EXISTING ELEVATION
	EXISTING CONTOUR
——— ———	DIRECTION OF FLOW
AREA N 6.4 AC	DRAINAGE AREA AMOUNT IN ACRES
Ⓐ	LOCATION OF DITCH ELEVATION SEE EXHIBIT 18

Revisions dated 12/12/02
by Ex. Grad. Inc.
PO Box 1629, 201 East Sirian Street
Bryan, TX 77837
Ph: (361)384-1284 Fax: (361)364-8658

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

Revisions dated 1/31/07 (Cell I Excavation Elevation Change)
by Sigma Engineers and Consultants, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0233

EXHIBIT NUMBER 11

DRAINAGE AREA PLAN – AREA I

STANDARD OPERATING PERMIT APPLICATION

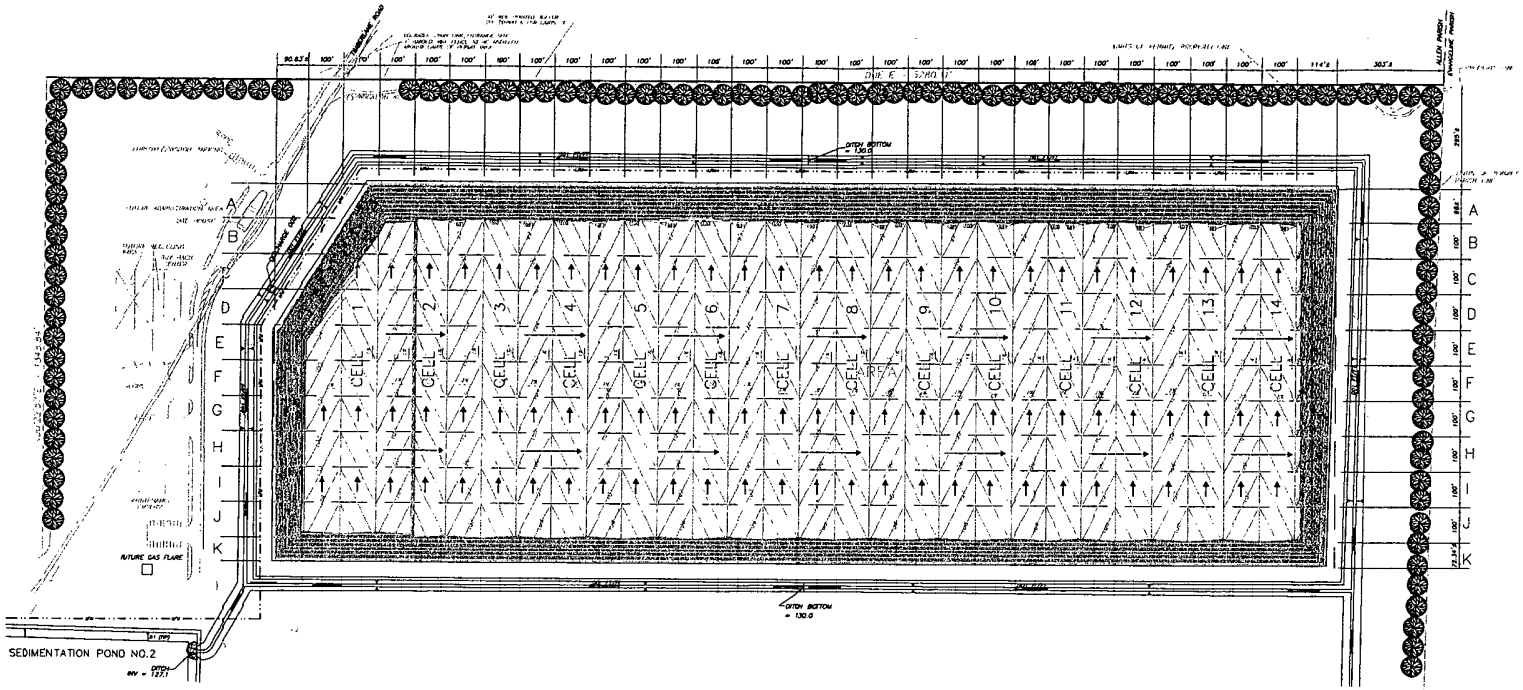
TIMBERLANE LANDFILL

IESI LA LANDFILL CORPORATION

mader-miers

REVISED	INITIALS	ENGINEER	
REVISED		DRAWN BY	
REVISED		CHECKED	
REVISED		APPROVED	

DATE: 12-17-02 | BOOK ___ Pg ___ | FILE D | SPN 1253 | SPM 07 | DWG ___



LEGEND

	PROPOSED CONTOURS
	DIRECTION OF FLOW
↑	DIRECTION OF FILL IN CELL
←	SEQUENCE OF CELL CONSTRUCTION
K	SEGMENT LETTER
CELL 1	CELL NUMBER
	LIMITS OF PERMIT/PROPERTY LINE
	LIMITS OF PERMIT
	CELL LIMITS

NOTE: AT TIMES DURING THE FILLING PROCESS WASTE MAY BE DISPOSED OF IN 2 OR MORE ADJACENT CELLS AT THE SAME TIME. (SUCH AS CELLS 1,2, & 3 BEING FILLED SIMULTANEOUSLY STARTING AT SEGMENT K AND PROCEEDING TO SEGMENT A) IF IT SHOULD BECOME NECESSARY TO CHANGE THE PLANNED SEQUENCE, THE LDEQ WILL BE NOTIFIED IN WRITING OF THE PROPOSED CHANGES.

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Constructors, Inc.
10365 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/13/02
by Jim Brown
Sigma, Inc. 321 East Brown Street
Baton, LA 70267
Ph: (361)364-1284 Fax: (361)364-3886

Earth Tech, Inc.
1233 Industrialplex
Baton Rouge, LA 70809
Ph: (225)753-0001 Fax: (225)753-0401

EXHIBIT NUMBER 12

SITE GRID SYSTEM

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

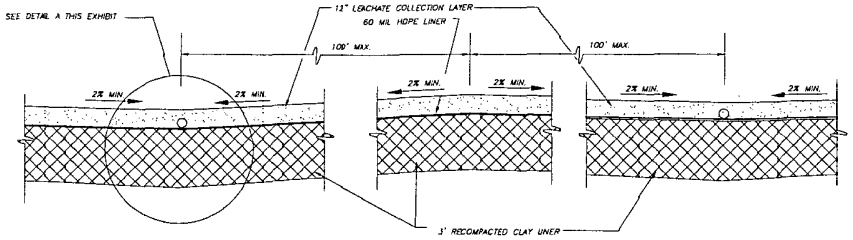
IESI LA LANDFILL CORPORATION

cmader-cmiers

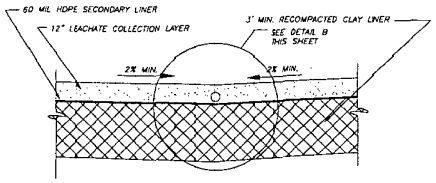
10-10-07	DRAWN	FLR	
	DESIGN BY	JCR	
	DESIGN	FLR	
	APPROVED	FLR	

DATE: ____ BOOK ____ Pg ____ FILE 2 SPN 1265 SPN 27 DWG ____

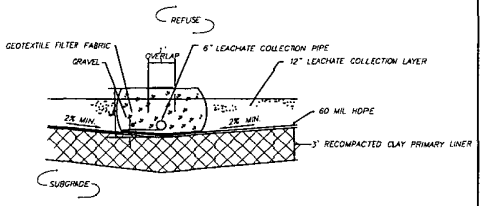
LDEQ-EDMS Document 36287415, Page 117 of 132



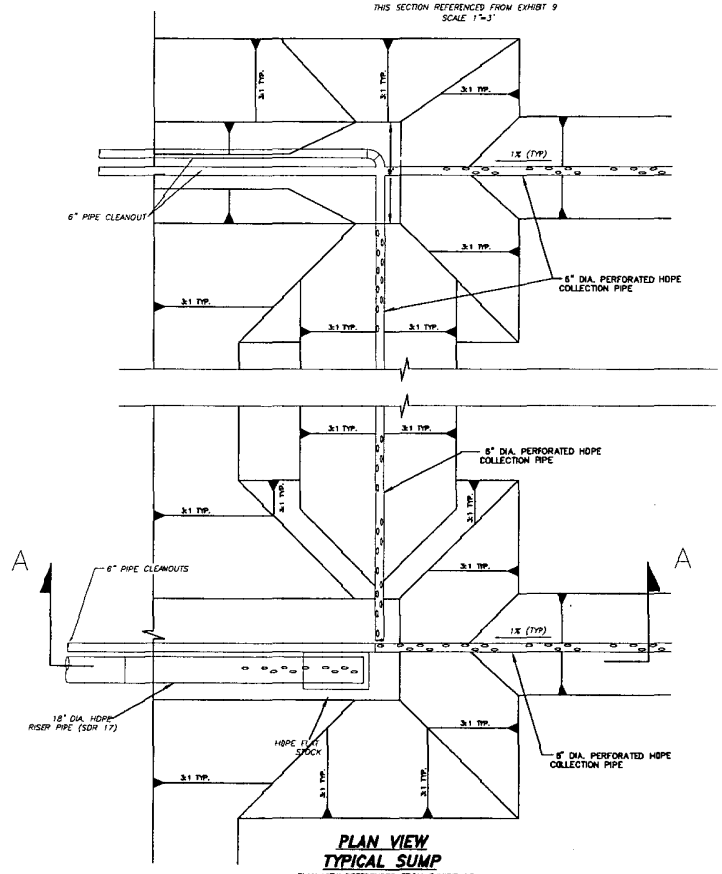
SECTION A
TYPICAL SECTION ACROSS LECHATE TRENCHES
THIS SECTION REFERENCED FROM EXHIBIT 9
SCALE 1"=3'



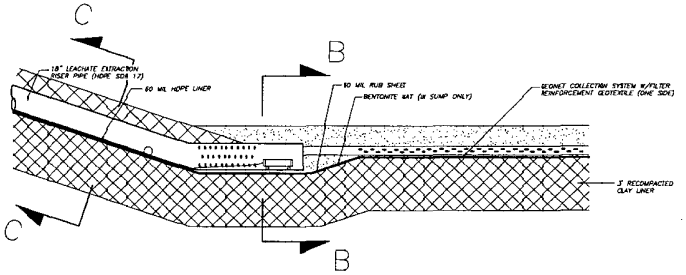
DETAIL A
TYPICAL SECTION COLLECTION SYSTEM
THIS SECTION REFERENCED FROM THIS EXHIBIT
SCALE 1"=3'



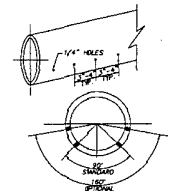
DETAIL B
TYPICAL LEACHATE COLLECTION TRENCH (CHIMNEY DRAIN)
THIS DETAIL REFERENCED FROM THIS EXHIBIT
SCALE 1"=1'



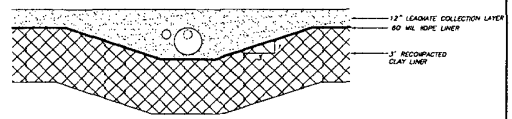
PLAN VIEW
TYPICAL SUMP
PLAN VIEW REFERENCED FROM EXHIBIT 13
SCALE 1"=3'



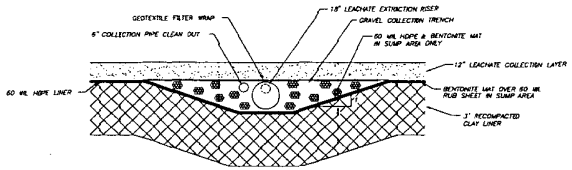
SECTION A–A
THIS SECTION REFERENCED FROM THIS EXHIBIT
SCALE 1"=3'



TYPICAL PERFORATED PIPE DETAIL FOR 6" COLLECTION
N.T.S.



SECTION C–C
THIS SECTION REFERENCED FROM SECTION A–A THIS EXHIBIT
SCALE 1"=3'



SECTION B–B
THIS SECTION REFERENCED FROM SECTION A–A THIS EXHIBIT
SCALE 1"=3'

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Gamma Engineers and COnstructors, Inc.
13305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 480 - 701 East Simon Street
Sinton, TX 78387
Ph: (361)364-1194 Fax: (361)364-2656

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 13

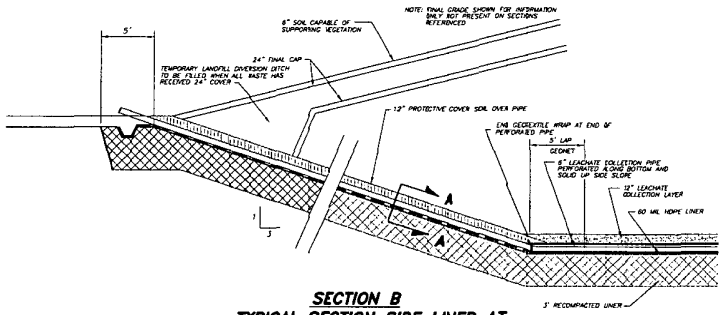
TYPICAL DISPOSAL AREA DETAILS
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION

mader-miers

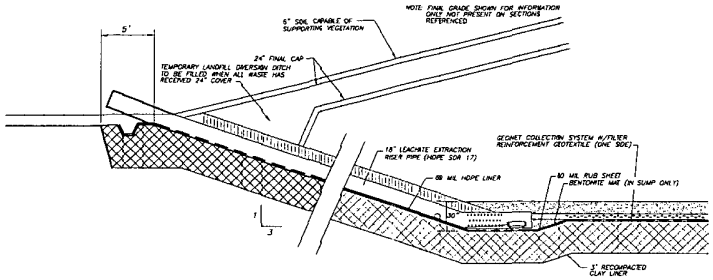
REVISED 10-8-97	ENGINEER P.L.W.		
REVISED	DRAWN BY J.P.W.		
REVISED	CHECKED P.L.W.		
REVISED	APPROVED P.L.W.		

File Name Ex13
Plot Date 1-18-97

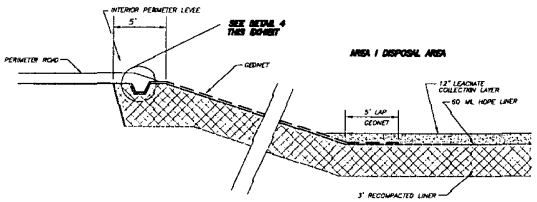
DATE: 6-18-96 | BOOK ___ Pg ___ | FILE ___ | BPN 1365 | SPN 07 | DWG ___



SECTION B
TYPICAL SECTION SIDE LINER AT LEACHATE CLEANOUT PIPE
SECTION REFERENCED FROM EXHIBITS 9 & 10
SCALE: 1" = 5'

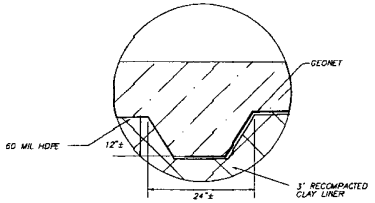


SECTION A
TYPICAL SECTION OF SIDE SLOPE AT COLLECTION SUMP
SECTION REFERENCED FROM EXHIBITS 8 AND 7
SCALE 1"=3'

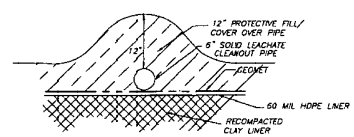


NOTE: GEONET OVER ENTIRE CELL FLOOR WITH 12" PROTECTIVE MAYBE USED IN PLACE OF 12" LEACHATE COLLECTION LAYER

SECTION C
TYPICAL SECTION LINER SYSTEM AT SIDE SLOPE
SECTION REFERENCED FROM EXHIBITS 9 & 10
SCALE: 1" = 5'



DETAIL 4
TYPICAL GEONET ANCHOR TRENCH
DETAIL REFERENCED FROM THIS EXHIBIT
SCALE: 1" = 1'



SECTION A-A
TYPICAL LEACHATE CLEANOUT PIPE ALONG SIDE SLOPE
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: 1" = 1'

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Signs Engineers and COnstructors, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0880 Fax: (225)298-0255

Revisions dated 12/4/02
by JFK Group, Inc.
PO Box 460 - 251 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656

Earth Tech, Inc.
11133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0088 Fax: (225)753-0401

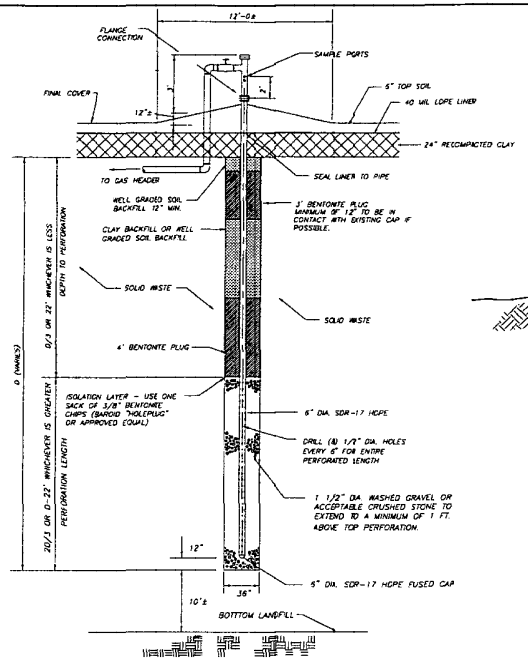
EXHIBIT NUMBER 14
TYPICAL DISPOSAL AREA DETAILS
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION

mader-miers
ENGINEERING, INC.

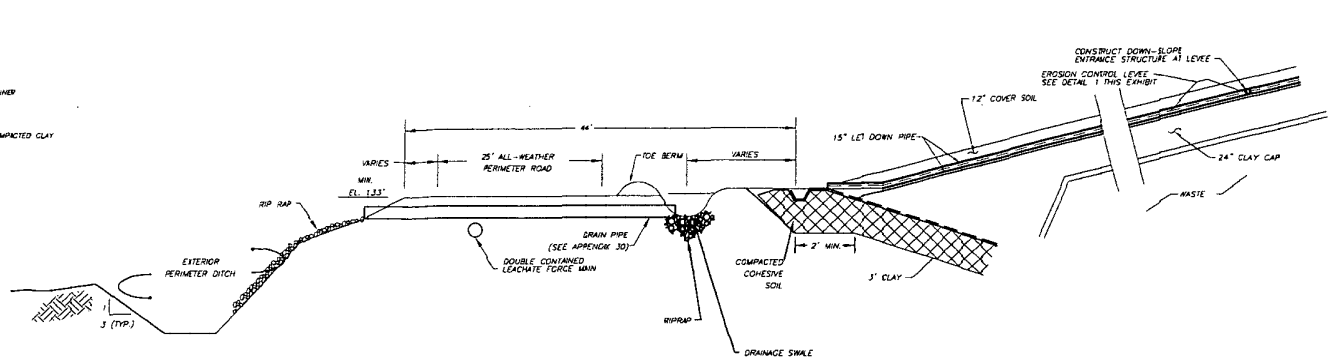
REVISED		ENGINEER	P.L.M.
REVISED		DRAWN BY	J.P.M.
REVISED		CHECKED	P.L.M.
REVISED		APPROVED	P.L.M.

File Name D14
Plot Date 12-18-96

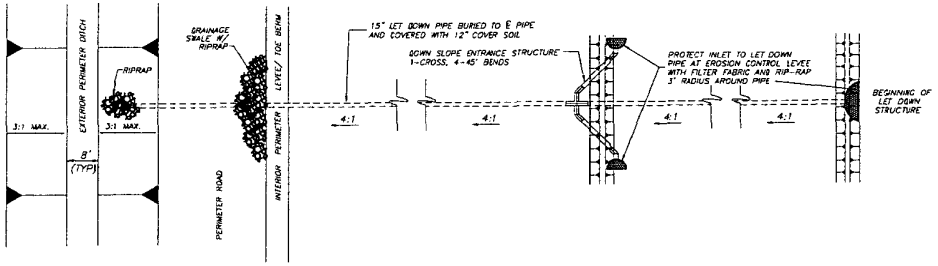
DATE: 06/18/96 | BOOK ____ Pg ____ | FILE ____ | BPN 1365 | SPN 07 | DWG ____



SECTION A
TYPICAL GAS RISER DETAIL
SECTION REFERENCED FROM EXHIBIT 13
N.T.S.



SECTION A
TYPICAL SECTION LET DOWN PIPE
SECTION REFERENCED FROM EXHIBIT 10
N.T.S.

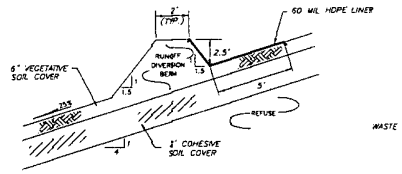


TYPICAL PLAN VIEW LET DOWN PIPE
N.T.S.

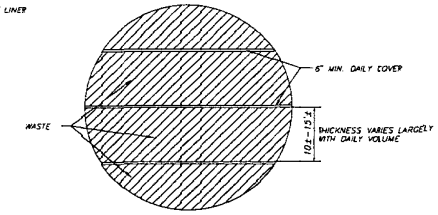
Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and COnstructors, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/4/02
by JFK Group, Inc.
PO Box 460 - 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656

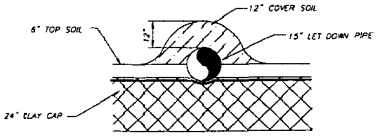
Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401



DETAIL 1
TYPICAL EROSION CONTROL LEVEE
* CONSTRUCT LEVEE UP LANDFILL SLOPE TO PRODUCE 1% GRADE TO LET DOWN PIPE



TYPICAL CROSS-SECTION OF DAILY FILL AND COVER
N.T.S.



SECTION A-A
TYPICAL SECTION THROUGH LET DOWN PIPE
N.T.S.
SECTION REFERENCED FROM THIS EXHIBIT

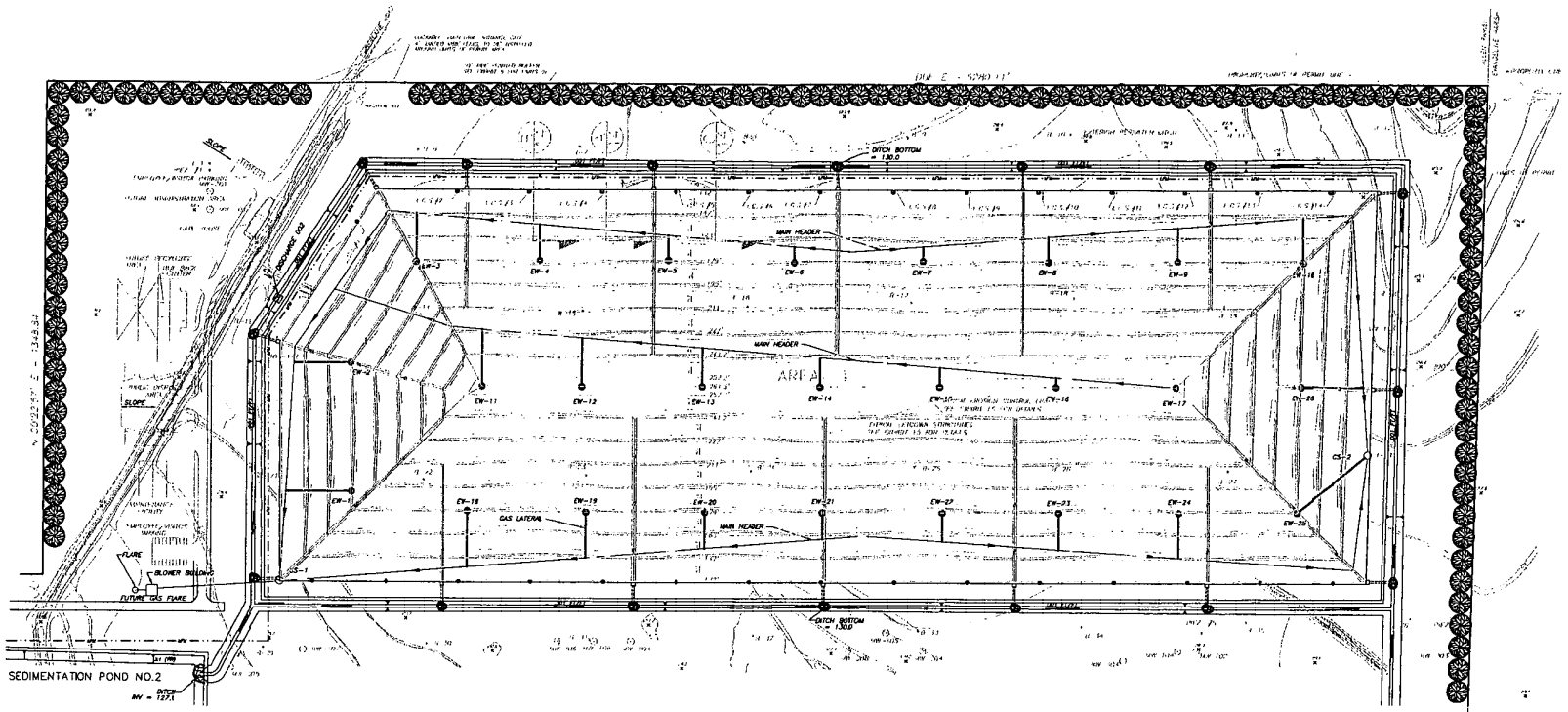
EXHIBIT NUMBER 15

TYPICAL DISPOSAL AREA DETAILS
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION

mader-miers engineers, inc.

REVISED		ENGINEER	P.L.W.
REVISED		DRAWN BY	J.P.W.
REVISED		CHECKED	P.L.W.
REVISED		APPROVED	P.L.W.

LDEQ-EDMS Document 36287415, Page 120 of 132



LEGEND

	BORING NUMBER & LOCATION
	MONITORING WELL NUMBER & LOCATION
	PIEZOMETER NUMBER & LOCATION
	EXISTING ELEVATION
	EXISTING CONTOUR
	PROPOSED FINAL CONTOURS
	DIRECTION OF FLOW
CS-2	CONDENSATE SUMP LOCATION AND NUMBER
	GAS LATERAL
	GAS HEADER
EW-25	GAS EXTRACTION WELL LOCATION AND NUMBER

Revisions dated 1/31/07 (Cell I Excavation Elevation Change)
by Sigma Engineers and COnstructors, Inc.
16305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0809 Fax: (225)298-0255

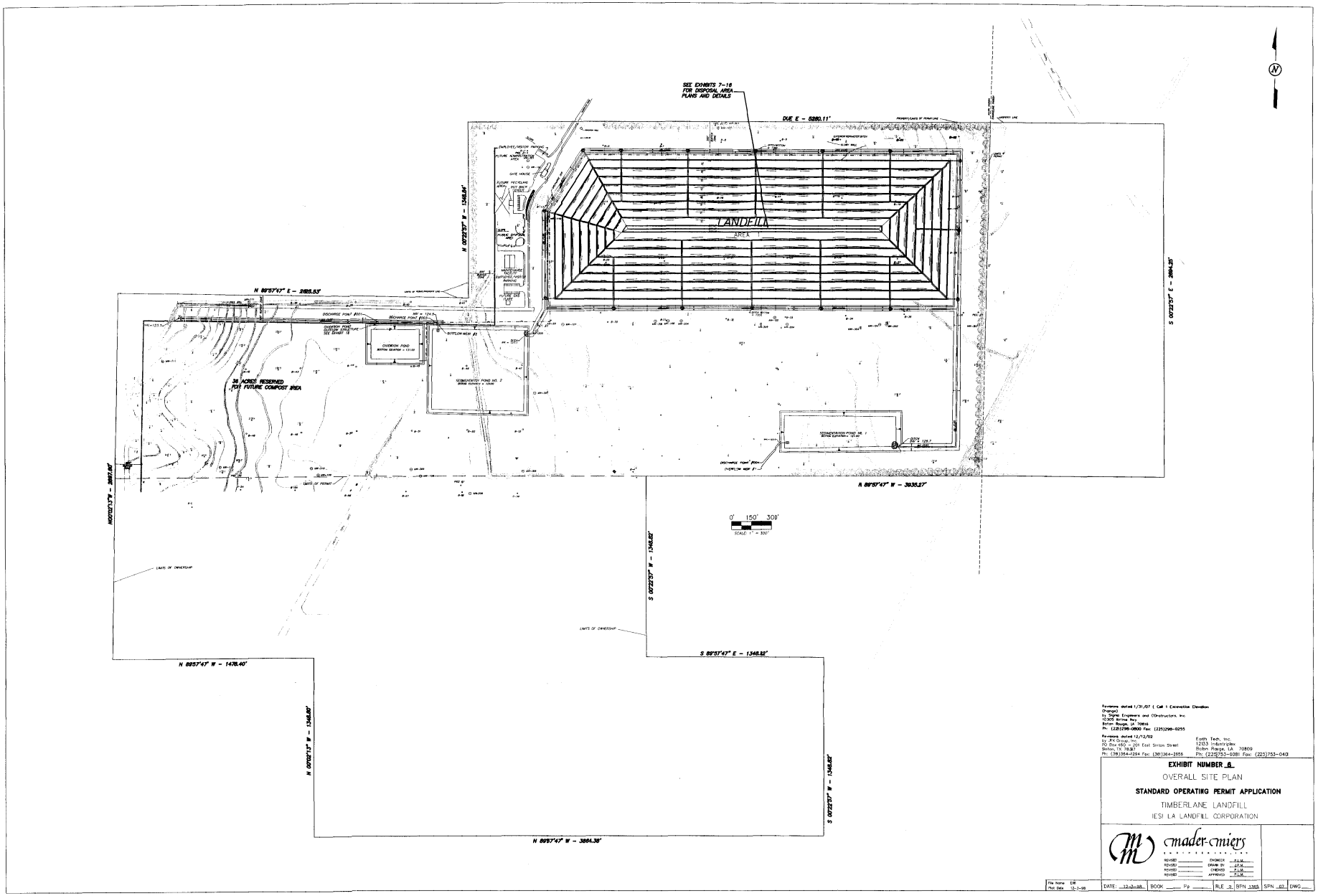
Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 460 - 201 East Sixton Street
Sixton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656

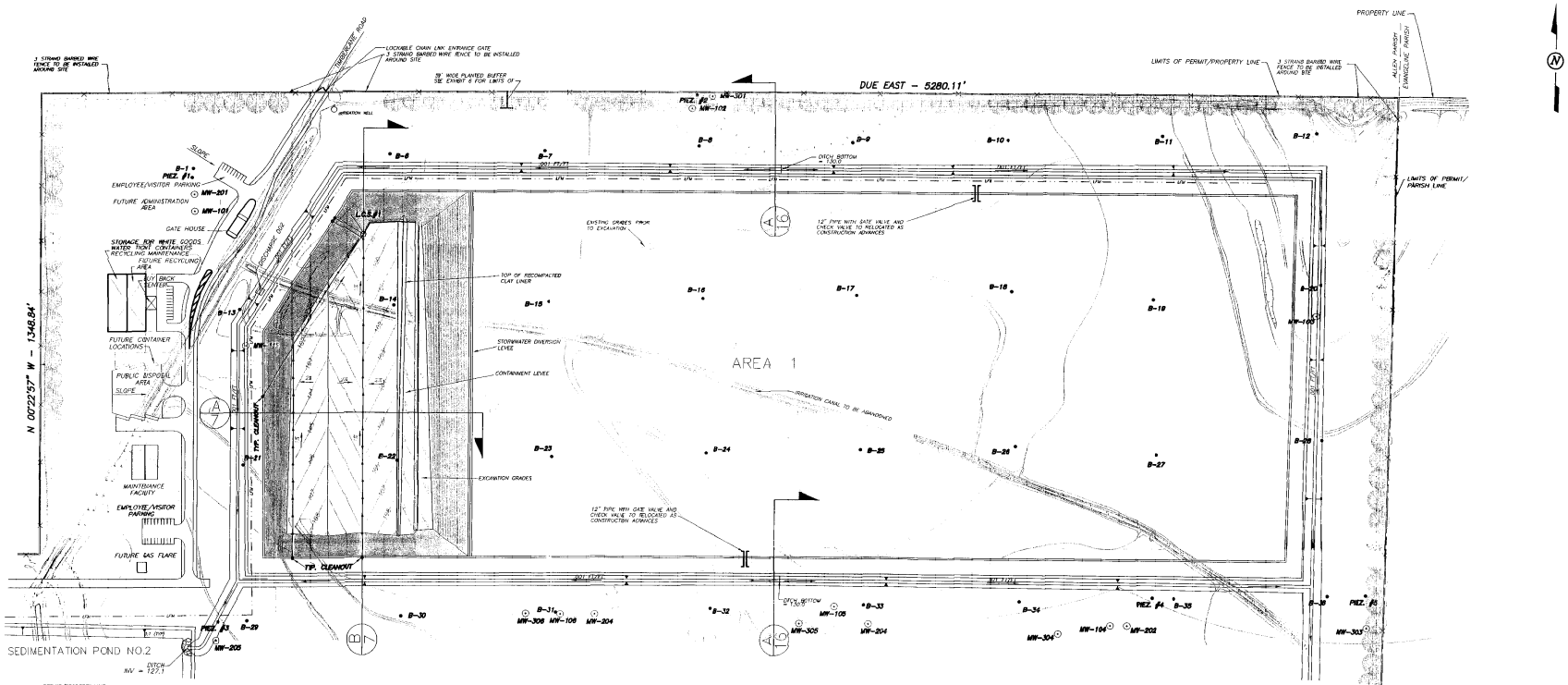
Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

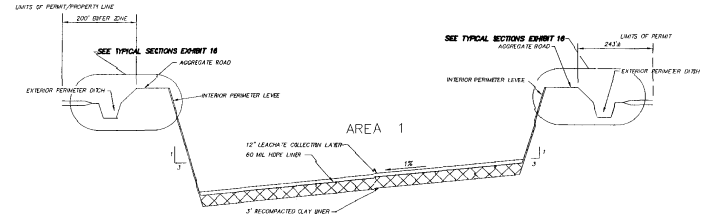
EXHIBIT NUMBER 19
GAS EXTRACTION SYSTEM
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION

mader-miers

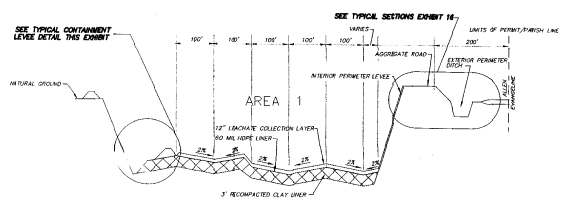
DATE: 12-17-98 | BOOK ___ Pg ___ | FILE 0 | BPN 1292 | SPN 07 | DWG ___


SEE EXHIBITS 7-16 FOR DISPOSAL AREA PLANS AND DETAILS
DUE E - 5280.11'
LANDFILL
AREA
N 89°57'47" E - 2625.53'
N 00°22'57" W - 1348.84'
S 00°22'57" E - 2694.25'
N 89°57'47" W - 3935.27'
36 ACRES RESERVED FOR FUTURE COMPOST AREA
N 00°02'13" W - 2667.80'
S 00°22'57" W - 1348.82'
S 89°57'47" E - 1348.82'
N 89°57'47" W - 1478.40'
N 00°02'13" W - 1348.80'
S 00°22'57" W - 1348.82'
N 89°57'47" W - 3864.38'
0' 150' 300'
SCALE: 1" = 300'
LIMITS OF OWNERSHIP
LIMITS OF PERMIT
EXHIBIT NUMBER 6
OVERALL SITE PLAN
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION
mader-miers
ENGINEER
DRAWN BY
CHECKED
APPROVED
DATE: 12-3-98
BOOK
RLE 3
BPN 1365
SPN 02
DWG

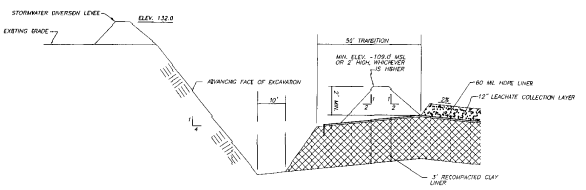




SECTION B
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: HORIZONTAL 1" = 200'
VERTICAL 1" = 20'



SECTION A
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: HORIZONTAL 1" = 200'
VERTICAL 1" = 20'



TYPICAL CONTAINMENT LEVEE DETAIL
DETAIL REFERENCED FROM SECTION A THIS EXHIBIT
N.T.S.

LEGEND

B 7	SECTION B EXHIBIT 7
• B-38	BORING NUMBER & LOCATION
MW-104	MONITORING WELL NUMBER & LOCATION
• PIEZ. #1	PIEZOMETER NUMBER & LOCATION
132.5	EXISTING ELEVATION
	EXISTING CONTOUR
132.5	PROPOSED CONTOURS
	DIRECTION OF FLOW

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Constructors, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/12/02
by JEK Group, Inc.
PO Box 460 – 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2856

Earth Tech, Inc.
12153 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 7

INITIAL SITE PLAN – AREA 1

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

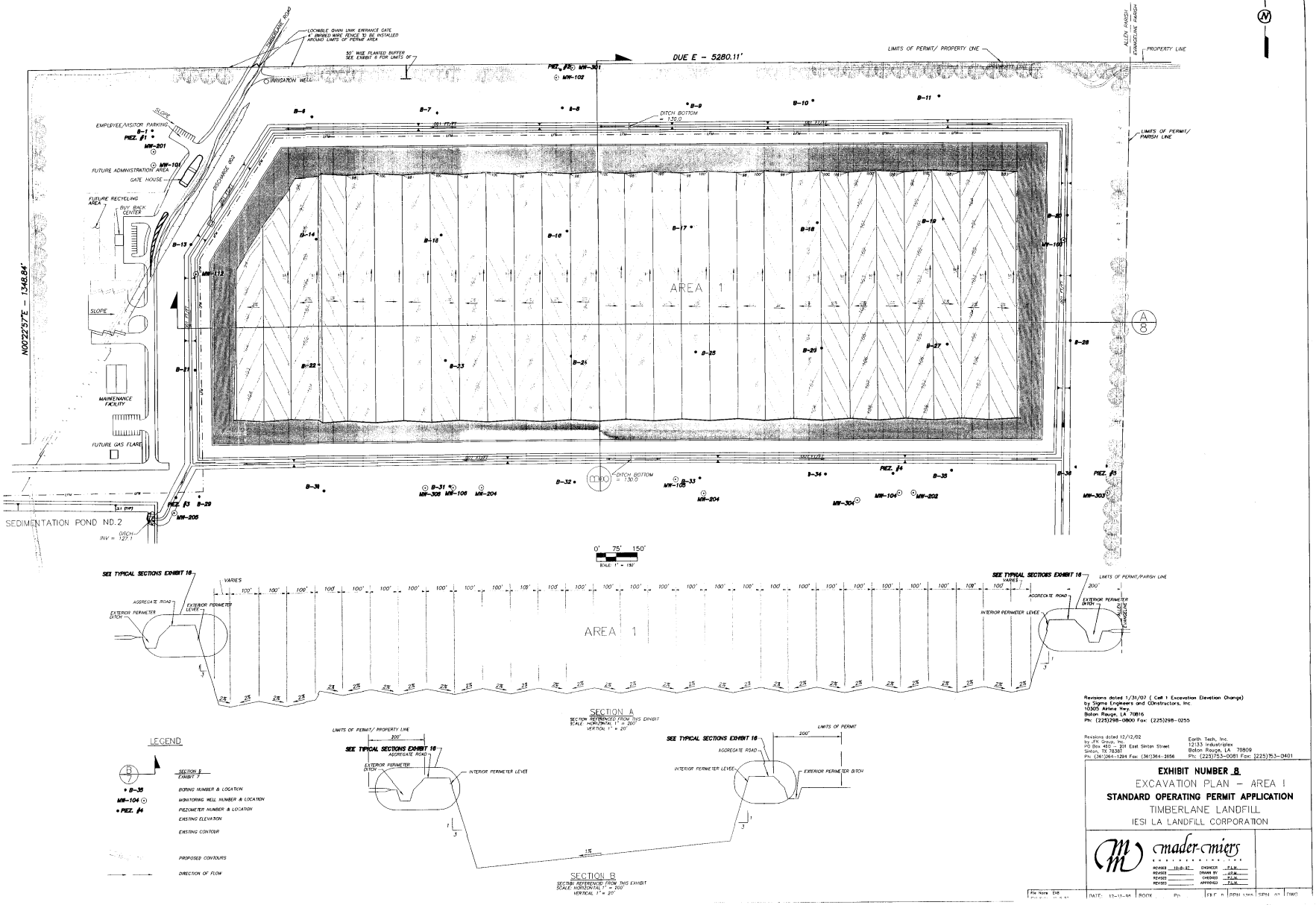
IESI LA LANDFILL CORPORATION

mader-miers engineering, inc.

REVISED 12-3-97	ENGINEER	FLR	
REVISED 12-4-98	DRAWN BY	JFR	
REVISED	CHECKED	FLR	
REVISED	APPROVED	FLR	

Re Name E37
Rel Date 12-8-98

DATE: 12/17/98 | BOOK ___ Pp ___ | FILE 01 | BPN 1365 | SPN 02 | DWG ___



Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Constructors, Inc
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 410 - 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 8

EXCAVATION PLAN - AREA I

STANDARD OPERATING PERMIT APPLICATION

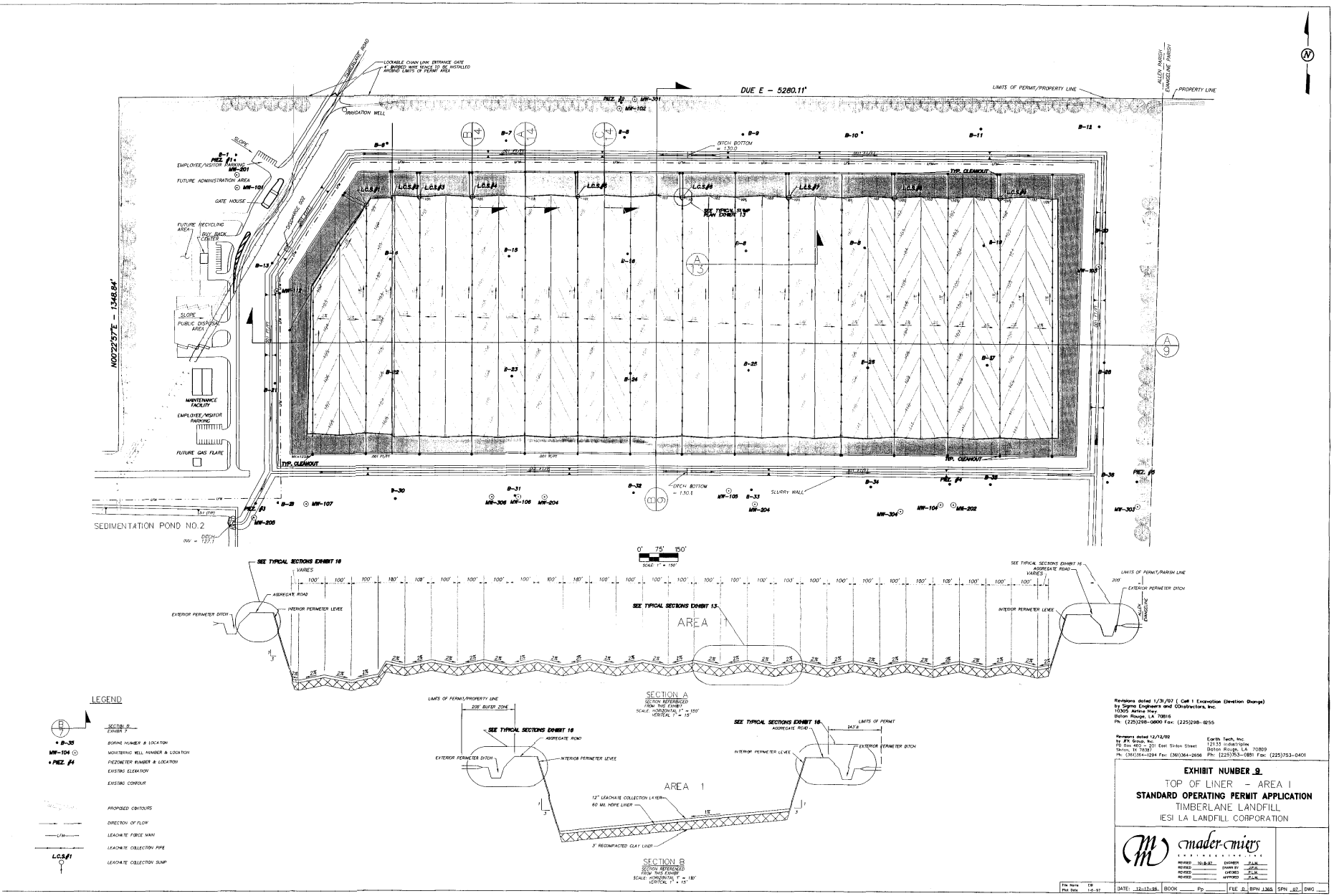
TIMBERLANE LANDFILL

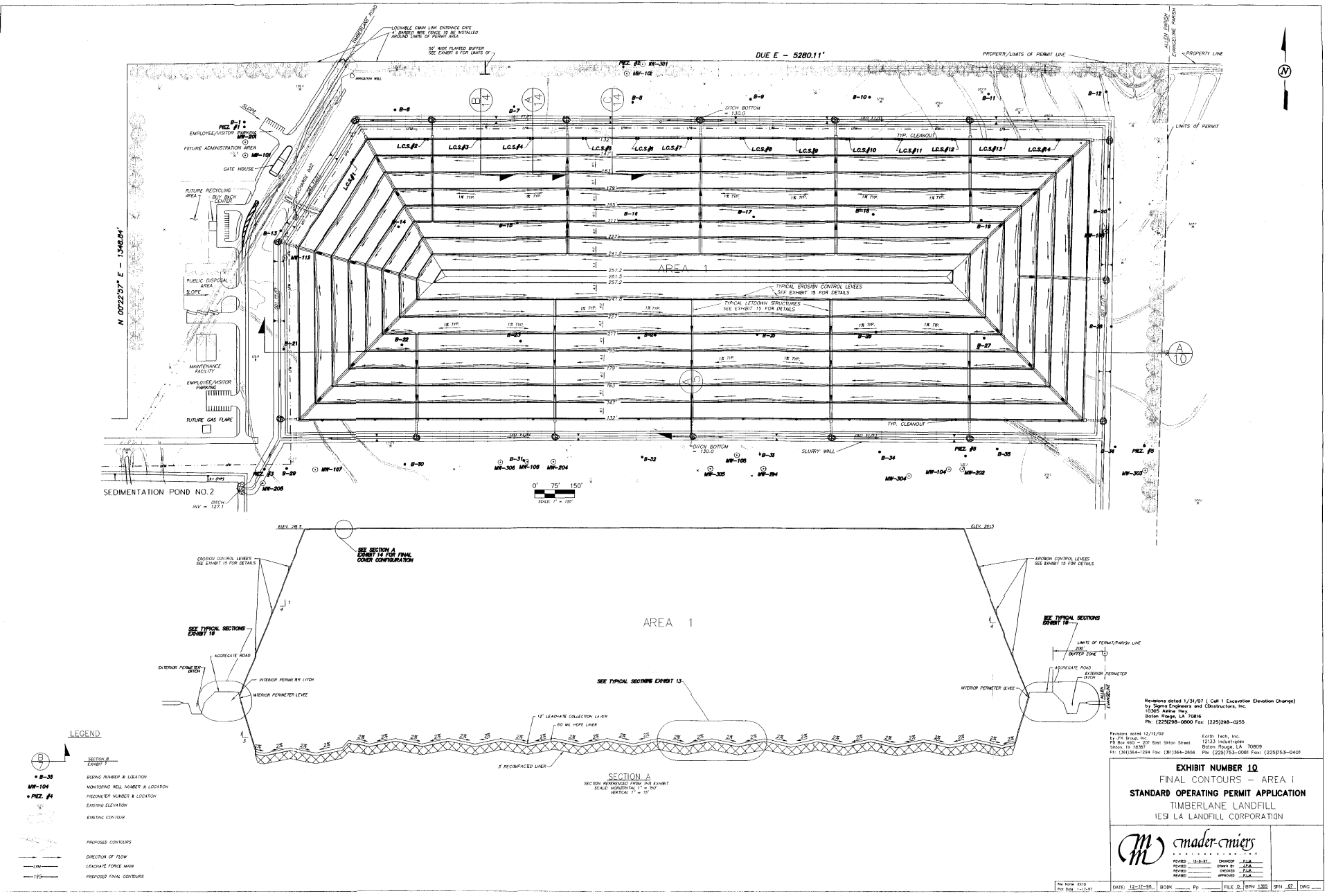
IESI LA LANDFILL CORPORATION

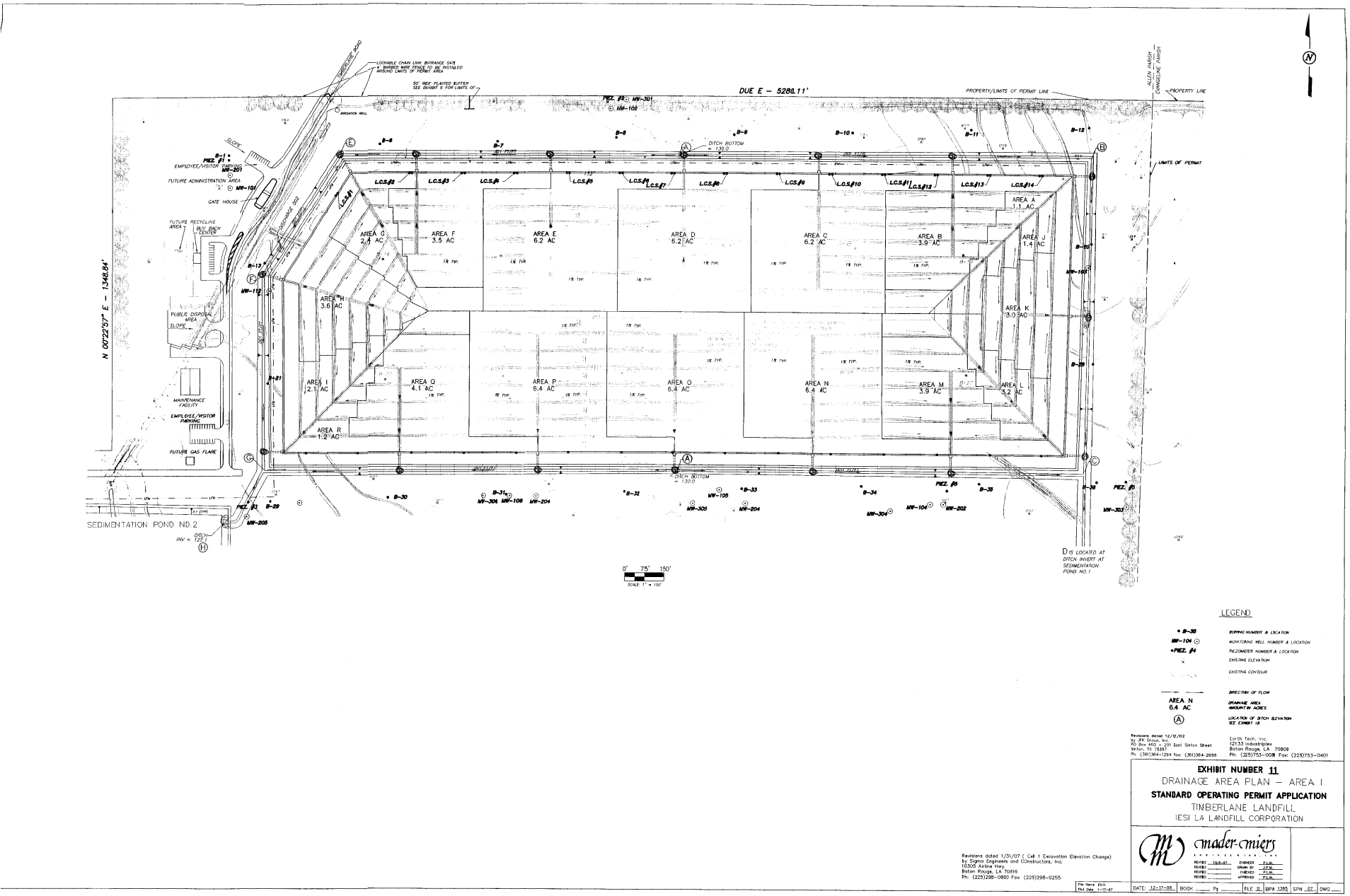
mader-miers engineering llc

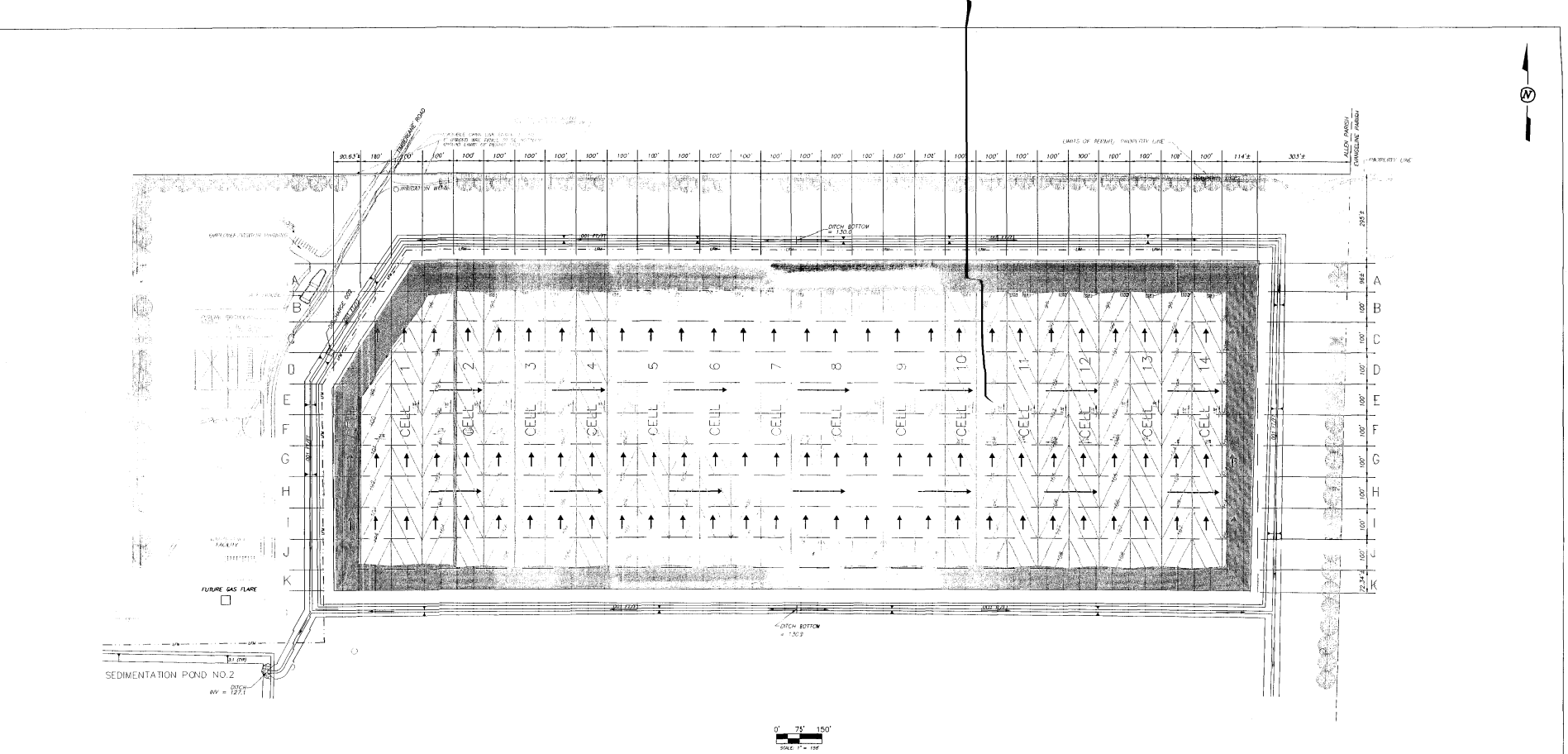
REVISED 10-8-97	ENGINEER	PLM
REVISED	DRAWN BY	JCM
REVISED	CHECKED	PLM
REVISED	APPROVED	PLM

DATE: 12-17-96 BOOK Pg FILE # DRN INS SPN DT TWG


DUE E - 5280.11'
N00°22'57"E - 1348.84'
LIMITS OF PERMIT/PROPERTY LINE
PROPERTY LINE
ALLEN PARISH
EVANGELINE PARISH
LOCKABLE CHAIN LINK ENTRANCE GATE
4' BARBED WIRE FENCE TO BE INSTALLED AROUND LIMITS OF PERMIT AREA
IRRIGATION WELL
EMPLOYEE/VISITOR PARKING
FUTURE ADMINISTRATION AREA
GATE HOUSE
FUTURE RECYCLING AREA
BUY BACK CENTER
SLOPE
PUBLIC DISPOSAL AREA
MAINTENANCE FACILITY
EMPLOYEE/VISITOR PARKING
FUTURE GAS FLARE
DISCHARGE 002
DITCH BOTTOM = 130.0
TYP. CLEANOUT
SEE TYPICAL SUMP PLAN EXHIBIT 13
SLURRY WALL
SEDIMENTATION POND NO.2
DITCH INV = 127.1
SEE TYPICAL SECTIONS EXHIBIT 16
SEE TYPICAL SECTIONS EXHIBIT 13
AREA 1
AGGREGATE ROAD
INTERIOR PERIMETER LEVEE
EXTERIOR PERIMETER DITCH
VARIES
SECTION A
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: HORIZONTAL 1" = 150' VERTICAL 1" = 15'
LIMITS OF PERMIT/PROPERTY LINE
200' BUFFER ZONE
SECTION B
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: HORIZONTAL 1" = 150' VERTICAL 1" = 15'
12" LEACHATE COLLECTION LAYER
60 MIL HDPE LINER
3' RECOMPACTED CLAY LINER
LEGEND
SECTION B EXHIBIT 7
B-35 BORING NUMBER & LOCATION
MW-104 MONITORING WELL NUMBER & LOCATION
PIEZ. #4 PIEZOMETER NUMBER & LOCATION
EXISTING ELEVATION
EXISTING CONTOUR
PROPOSED CONTOURS
DIRECTION OF FLOW
LEACHATE FORCE MAIN
LEACHATE COLLECTION PIPE
L.C.S.#1 LEACHATE COLLECTION SUMP
Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and COnstructors, Inc.
10305 Airline Hwy
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255
Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 460 - 201 East Sixton Street
Sixton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656
Earth Tech, Inc
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0881 Fax: (225)753-0401
EXHIBIT NUMBER 9
TOP OF LINER - AREA I
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION
mader-miers
ENGINEERING, INC.
REVISED 10-8-97
DATE: 12-17-96
BOOK Pp
FEE D
BPN 1365
SPN 07
DWG


DUE E - 5280.11'
N 00°22'57" E - 1348.84'
AREA 1
SEDIMENTATION POND NO.2
PROPERTY/LIMITS OF PERMIT LINE
PROPERTY LINE
LIMITS OF PERMIT
TYP. CLEANOUT
DITCH BOTTOM = 130.0
TYPICAL EROSION CONTROL LEVEES SEE EXHIBIT 15 FOR DETAILS
TYPICAL LETDOWN STRUCTURES SEE EXHIBIT 15 FOR DETAILS
SLURRY WALL
EMPLOYEE/VISITOR PARKING
FUTURE ADMINISTRATION AREA
GATE HOUSE
FUTURE RECYCLING AREA
BUY BACK CENTER
PUBLIC DISPOSAL AREA
MAINTENANCE FACILITY
FUTURE GAS FLARE
SLOPE
SEE SECTION A EXHIBIT 14 FOR FINAL COVER CONFIGURATION
SEE TYPICAL SECTIONS EXHIBIT 16
SEE TYPICAL SECTIONS EXHIBIT 13
AGGREGATE ROAD
EXTERIOR PERIMETER DITCH
INTERIOR PERIMETER LITCH
INTERIOR PERIMETER LEVEE
12" LEACHATE COLLECTION LAYER
60 MIL HDPE LINER
3' RECOMPACTED LINER
LIMITS OF PERMIT/PARISH LINE
200' BUFFER ZONE
ALLEN PARISH
EVANGELINE PARISH
SECTION A
SECTION REFERENCED FROM THIS EXHIBIT
SCALE: HORIZONTAL 1" = 150'
VERTICAL 1" = 15'
LEGEND
SECTION B EXHIBIT 7
B-35 BORING NUMBER & LOCATION
MW-104 MONITORING WELL NUMBER & LOCATION
PIEZ. #4 PIEZOMETER NUMBER & LOCATION
EXISTING ELEVATION
EXISTING CONTOUR
PROPOSED CONTOURS
DIRECTION OF FLOW
LEACHATE FORCE MAIN
PROPOSED FINAL CONTOURS
Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Constructors, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255
Revisions dated 12/12/02
by JPK Group, Inc.
PO Box 460 - 201 East Sikton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656
Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401
EXHIBIT NUMBER 10
FINAL CONTOURS - AREA I
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION
mader-miers
REVISED 12-6-97 ENGINEER PLM
REVISED DRAWN BY JPM
REVISED CHECKED PLM
REVISED APPROVED PLM
File Name EX10
Plot Date 1-17-07
DATE: 12-17-96 BOOK Pp FILE D BPN 1365 SPN 07 DWG


DUE E – 5280.11'
N 00°22'57" E – 1348.84'
PROPERTY/LIMITS OF PERMIT LINE
PROPERTY LINE
ALLEN PARISH
EVANGELINE PARISH
LIMITS OF PERMIT
LOCKABLE CHAIN LINK ENTRANCE GATE
4' BARBED WIRE FENCE TO BE INSTALLED AROUND LIMITS OF PERMIT AREA
50' WIDE PLANTED BUFFER SEE EXHIBIT 6 FOR LIMITS OF
TIMBERLANE ROAD
IRRIGATION WELL
SLOPE
EMPLOYEE/VISITOR PARKING
FUTURE ADMINISTRATION AREA
GATE HOUSE
FUTURE RECYCLING AREA
BUY BACK CENTER
PUBLIC DISPOSAL AREA
MAINTENANCE FACILITY
EMPLOYEE/VISITOR PARKING
FUTURE GAS FLARE
SEDIMENTATION POND NO.2
DITCH INV = 127.1
DITCH BOTTOM = 130.0
AREA A 1.1 AC
AREA B 3.9 AC
AREA C 6.2 AC
AREA D 6.2 AC
AREA E 6.2 AC
AREA F 3.5 AC
AREA G 2.4 AC
AREA H 3.6 AC
AREA I 2.1 AC
AREA J 1.4 AC
AREA K 3.0 AC
AREA L 3.2 AC
AREA M 3.9 AC
AREA N 6.4 AC
AREA O 6.4 AC
AREA P 6.4 AC
AREA Q 4.1 AC
AREA R 1.2 AC
L.C.S.#1
L.C.S.#2
L.C.S.#3
L.C.S.#4
L.C.S.#5
L.C.S.#6
L.C.S.#7
L.C.S.#8
L.C.S.#9
L.C.S.#10
L.C.S.#11
L.C.S.#12
L.C.S.#13
L.C.S.#14
PIEZ. #1
PIEZ. #2
PIEZ. #3
PIEZ. #4
PIEZ. #5
PIEZ. #6
MW-101
MW-102
MW-103
MW-104
MW-105
MW-106
MW-201
MW-202
MW-203
MW-204
MW-205
MW-301
MW-302
MW-303
MW-304
MW-305
MW-306
MW-112
B-1
B-6
B-7
B-8
B-9
B-10
B-11
B-12
B-13
B-20
B-21
B-29
B-30
B-31
B-32
B-33
B-34
B-35
B-36
0' 75' 150'
SCALE: 1" = 150'
D IS LOCATED AT DITCH INVERT AT SEDIMENTATION POND NO. 1
LEGEND
B-35 BORING NUMBER & LOCATION
MW-104 MONITORING WELL NUMBER & LOCATION
PIEZ. #4 PIEZOMETER NUMBER & LOCATION
EXISTING ELEVATION
EXISTING CONTOUR
DIRECTION OF FLOW
AREA N 6.4 AC DRAINAGE AREA AMOUNT IN ACRES
A LOCATION OF DITCH ELEVATION SEE EXHIBIT 18
Revisions dated 12/2/02
by JPK Group, Inc.
PO Box 460 – 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656
Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0038 Fax: (225)753-0401
EXHIBIT NUMBER 11
DRAINAGE AREA PLAN – AREA I
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION
Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and CConstructors, Inc.
10305 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255
File Name: EX11
Plot Date: 1-17-07
mader-miers
ENGINEERING
REVISED 10-5-07 ENGINEER P.L.M.
REVISED DRAWN BY J.P.M.
REVISED CHECKED P.L.M.
REVISED APPROVED P.L.M.
DATE: 12-17-96 BOOK Pg FILE 0 BPM 1365 SPN 07 DWG



LEGEND

	PROPOSED CONTOURS
	DIRECTION OF FLOW
↑	DIRECTION OF FILL IN CELL
←	SEQUENCE OF CELL CONSTRUCTION
K	SEGMENT LETTER
CELL 1	CELL NUMBER
	LIMITS OF PERMIT/PROPERTY LINE
	LIMITS OF PERMIT
	CELL LIMITS

NOTE: AT TIMES DURING THE FILLING PROCESS WASTE MAY BE DISPOSED OF IN 2 OR MORE ADJACENT SELLS AT THE SAME TIME. (SUCH AS CELLS 1,2, & 3 BEING FILLED SIMULTANEOUSLY STARTING AT SEGMENT K AND PROCEEDING TO SEGMENT A) IF IT SHOULD BECOME NECESSARY TO CHANGE THE PLANNED SEQUENCE, THE LDEQ WILL BE NOTIFIED IN WRITING OF THE PROPOSED CHANGES.

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and COnstructors, Inc
10365 Airline Hwy
Baton Rouge, LA 70816
Ph: (225)298-9800 fax: (225)298-0255

Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 460 – 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1284 Fax: (361)364-2656

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0081 Fax: (225)753-0401

EXHIBIT NUMBER 12

SITE GRID SYSTEM

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

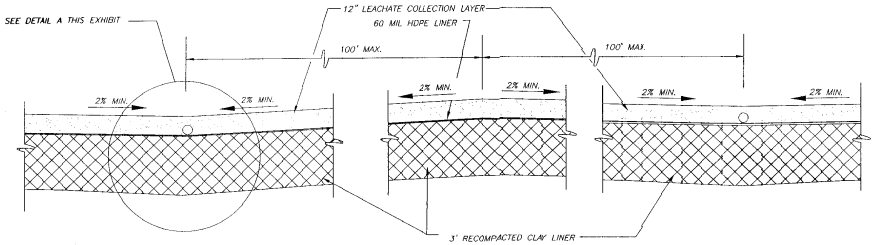
IESI LA LANDFILL CORPORATION

mader-miers ENGINEERING INC

REVISED 10-6-97	DRAWN BY PJM		
REVISED	DRAWN BY JFM		
REVISED	CHECKED PJM		
REVISED	APPROVED PJM		

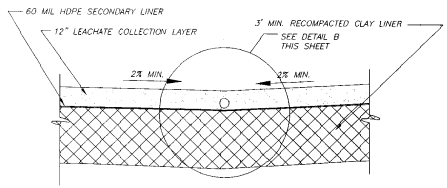
File Name
Plot Date

DATE: | BOOK ___ Pp ___ | FILE D | BPN 1365 | SPN 87 | DWG ___



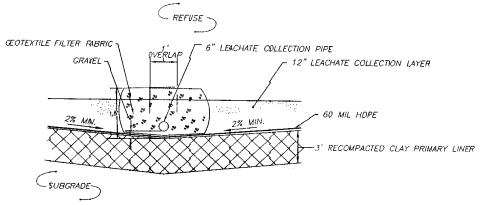
SECTION A
TYPICAL SECTION ACROSS LECHATE TRENCHES

THIS SECTION REFERENCED FROM EXHIBIT 9
SCALE 1"=3'



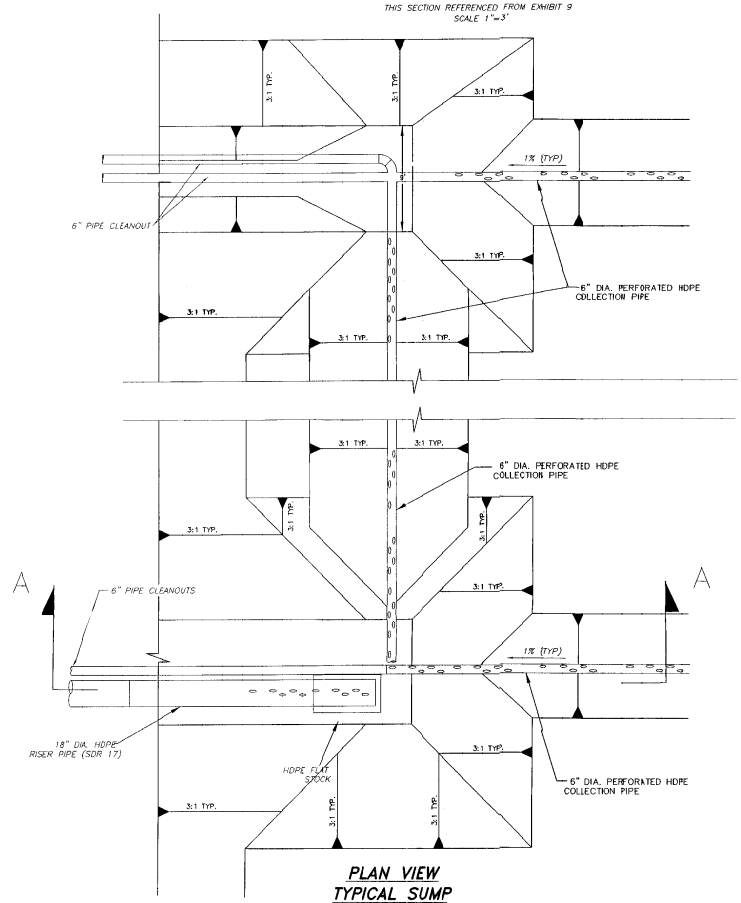
DETAIL A
TYPICAL SECTION COLLECTION SYSTEM

THIS SECTION REFERENCED FROM THIS EXHIBIT
SCALE 1"=3'



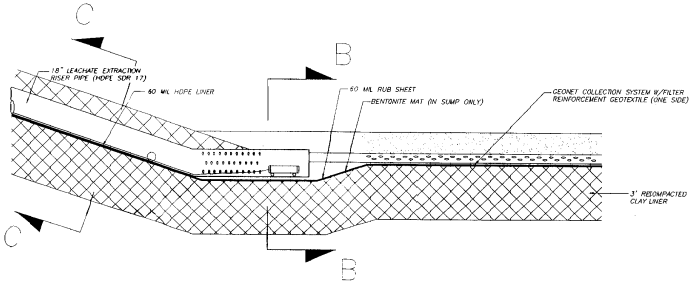
DETAIL B
TYPICAL LEACHATE COLLECTION TRENCH (CHIMNEY DRAIN)

THIS DETAIL REFERENCED FROM THIS EXHIBIT
SCALE 1"=1'



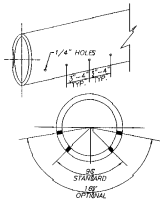
PLAN VIEW
TYPICAL SUMP

PLAN VIEW REFERENCED FROM EXHIBIT 13
SCALE 1"=3'



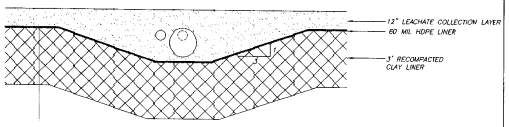
SECTION A–A

THIS SECTION REFERENCED FROM THIS EXHIBIT
SCALE 1"=3'



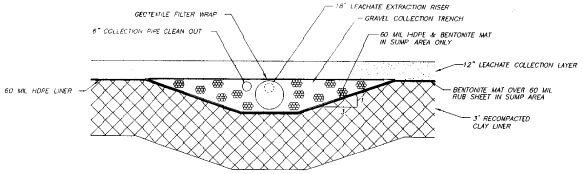
TYPICAL PERFORATED PIPE DETAIL FOR 6" COLLECTION

N.T.S.



SECTION C–C

THIS SECTION REFERENCED FROM SECTION A–A THIS EXHIBIT
SCALE 1"=3'



SECTION B–B

THIS SECTION REFERENCED FROM SECTION A–A THIS EXHIBIT
SCALE 1"=3'

Revisions dated 1/31/07 (Cell 1 Excavation Elevation Change)
by Sigma Engineers and Consultants, Inc.
10365 Airline Hwy.
Baton Rouge, LA 70816
Ph: (225)298-0800 Fax: (225)298-0255

Revisions dated 12/12/02
by JFK Group, Inc.
PO Box 460 – 201 East Sinton Street
Sinton, TX 78387
Ph: (361)364-1294 Fax: (361)364-2656

Earth Tech, Inc.
12133 Industriplex
Baton Rouge, LA 70809
Ph: (225)753-0881 Fax: (225)753-0401

EXHIBIT NUMBER 13

TYPICAL DISPOSAL AREA DETAILS

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

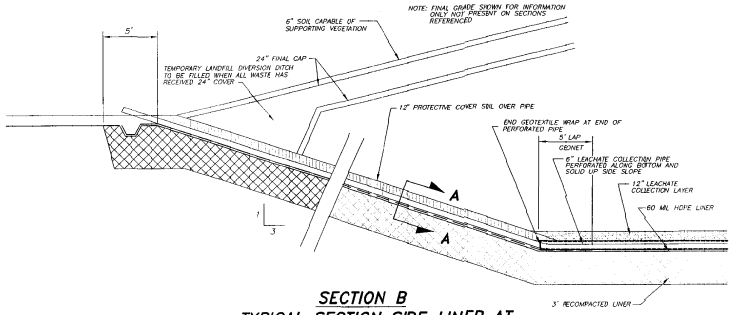
IESI LA LANDFILL CORPORATION

mader-miers ENGINEERING, INC

REVISED	10-8-97	ENGINEER	P.L.M.
REVISED		DRAWN BY	J.P.M.
REVISED		CHECKED	P.L.M.
REVISED		APPROVED	P.L.M.

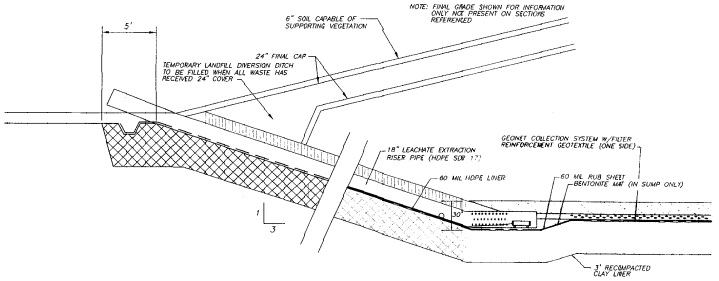
File Name EX13
Plot Date 1-18-97

DATE: 6-18-96 | BOOK ___ Pp ___ | FILE ___ | DPN 1365 | SPN 07 | DWG ___



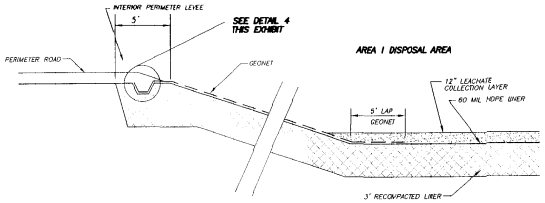
SECTION B
TYPICAL SECTION SIDE LINER AT LEACHATE CLEANOUT PIPE

SECTION REFERENCED FROM EXHIBITS 9 & 10
SCALE: 1" = 5'



SECTION A
TYPICAL SECTION OF SIDE SLOPE AT COLLECTION SUMP

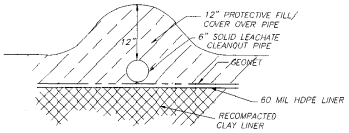
SECTION REFERENCED FROM EXHIBITS 6 AND 7
SCALE 1"=3'



NOTE: GEONET OVER ENTIRE CELL FLOOR WITH 12" PROTECTIVE MAYBE USED IN PLACE OF 12" LEACHATE COLLECTION LAYER

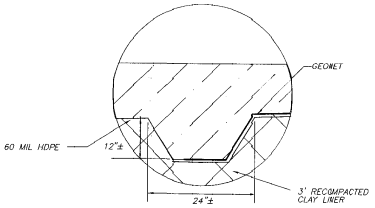
SECTION C
TYPICAL SECTION LINER SYSTEM AT SIDE SLOPE

SECTION REFERENCED FROM EXHIBITS 9 & 10
SCALE: 1" = 5'



SECTION A-A
TYPICAL LEACHATE CLEANOUT PIPE ALONG SIDE SLOPE

SECTION REFERENCED FROM THIS EXHIBIT
SCALE: 1" = 1'



DETAIL 4
TYPICAL GEONET ANCHOR TRENCH

DETAIL REFERENCED FROM THIS EXHIBIT
SCALE: 1" = 1'

Revisions dated 1/31/97 (Cell 1 Excavation Elevation Change)
By Sigma Engineers and COnstructors, Inc.
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Ph: (225)753-0008 Fax: (225)753-0401

EXHIBIT NUMBER 14

TYPICAL DISPOSAL AREA DETAILS

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

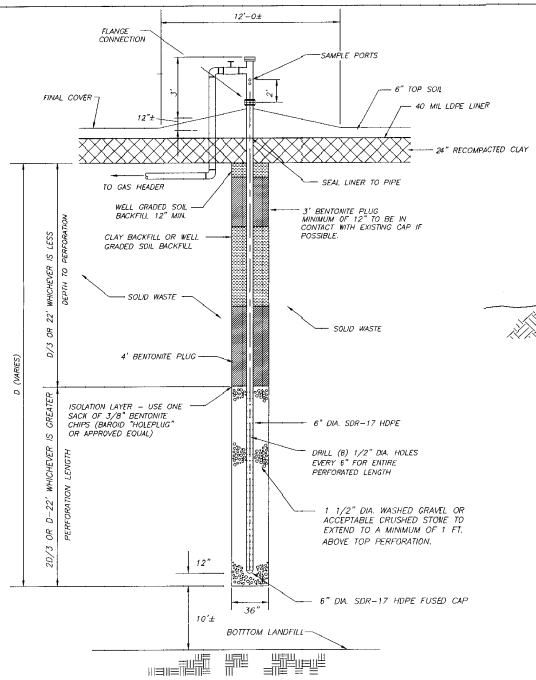
IESI LA LANDFILL CORPORATION

mader-miers ENGINEERING, INC

REVISED		ENGINEER	P.L.M.
REVISED		DRAWN BY	J.P.M.
REVISED		CHECKED	P.L.M.
REVISED		APPROVED	P.L.M.

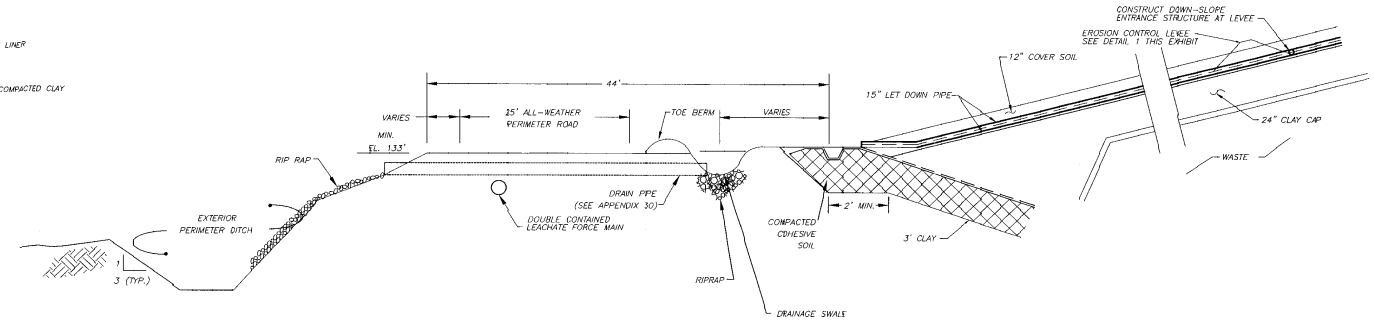
File Name EX14
Last Date 12-18-96

DATE: 06/18/96 | BOOK ___ Pg ___ | FILE | BPN 1365 | SPN 07 | DWG ___



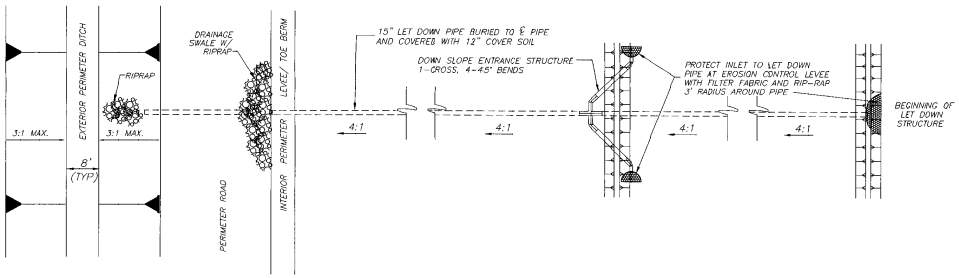
SECTION A
TYPICAL GAS RISER DETAIL

SECTION REFERENCED FROM EXHIBIT 19
N.T.S.



SECTION A
TYPICAL SECTION LET DOWN PIPE

SECTION REFERENCED FROM EXHIBIT 10
N.T.S.



TYPICAL PLAN VIEW LET DOWN PIPE

N.T.S.

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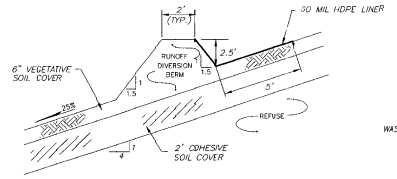
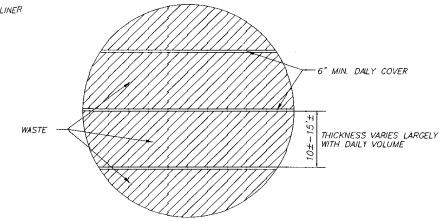


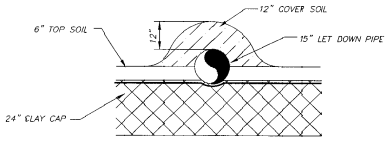
DETAIL 1
TYPICAL EROSION CONTROL LEVEE

* CONSTRUCT LEVEE UP LANDFILL SLOPE TO PRODUCE 1% GRADE TO LET DOWN PIPE



TYPICAL CROSS-SECTION OF DAILY FILL AND COVER

N.T.S.



SECTION A-A
TYPICAL SECTION THROUGH LET DOWN PIPE

N.T.S.
SECTION REFERENCED FROM THIS EXHIBIT

EXHIBIT NUMBER 15

TYPICAL DISPOSAL AREA DETAILS
STANDARD OPERATING PERMIT APPLICATION
TIMBERLANE LANDFILL
IESI LA LANDFILL CORPORATION

mader-miers ENGINEERING, INC.

REVISED	ENGINEER	P.L.M.
REVISED	DRAWN BY	J.P.M.
REVISED	CHECKED	P.L.M.
REVISED	APPROVED	P.L.M.

File Name EX15
Plot Date 1-20-97

DATE 6-18-96 | BOOK ___ Pp ___ | FILE ___ | RPN 1365 | SPN 07 | DWG ___

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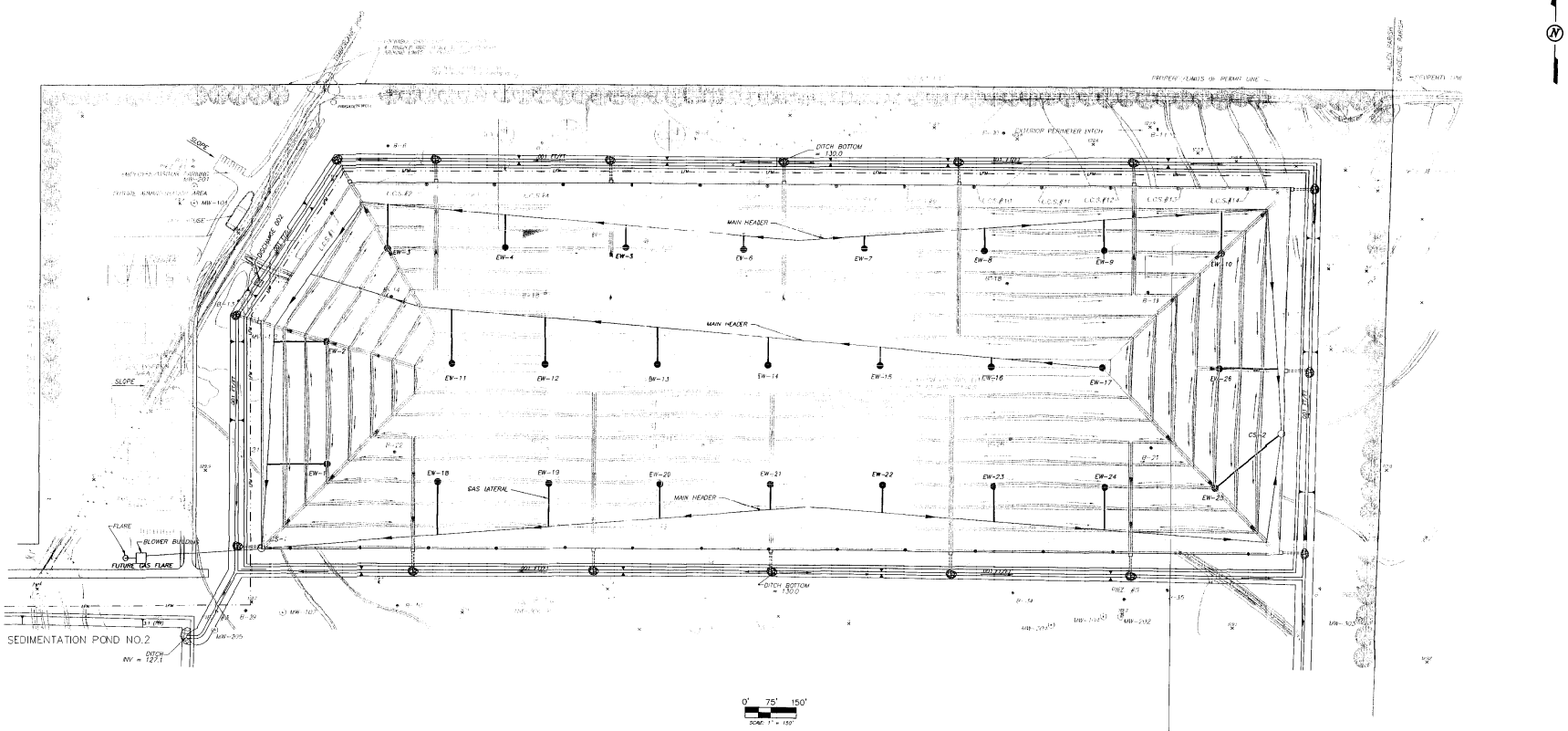

LEGEND

BORING NUMBER & LOCATION
MONITORING WELL NUMBER & LOCATION
PIEZOMETER NUMBER & LOCATION
EXISTING ELEVATION
EXISTING CONTOUR
PROPOSED FINAL CONTOURS
DIRECTION OF FLOW
CS-2 CONDENSATE SUMP LOCATION AND NUMBER
GAS LATERAL
GAS HEADER
EW-25 GAS EXTRACTION WELL LOCATION AND NUMBER

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EXHIBIT NUMBER 19

GAS EXTRACTION SYSTEM

STANDARD OPERATING PERMIT APPLICATION

TIMBERLANE LANDFILL

IESI LA LANDFILL CORPORATION

mader-miers ENGINEERING, INC.

REVISED 12-18-97	ENGINEER	FLM	
REVISED	DRAWN BY	FLM	
REVISED	CHECKED	FLM	
REVISED	APPROVED	FLM	

File Name: EH19
Plot Date: 12-17-96

DATE: 12-17-96 | BOOK ___ Pp ___ | FILE D | BPN 1285 | SPN 07 | DWG ___

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