



PROJECT NUMBER

SEA 24607.D1

BORING NUMBER

KGP-41

SHEET

1

OF

SOIL BORING LOG

PROJECT KENT HIGHLANDS LANDFILL GAS PROBE INSTALLATION LOCATION KENTELEVATION -277DRILLING CONTRACTOR TACOMA PUMPDRILLING METHOD AND EQUIPMENT AIR ROTARYWATER LEVELS As ShownSTART 10-3-91

0845

FINISH

LOGGER R.F. FAUBION

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (%)			
5.5		CONC. 2	100	6"-6"-6" (N)	Gray, clayey SILT: some to trace sand & gravel; trace wood frags; moist few chunks concrete (FILL) grades to silty CLAY & is wet below 4 ft	Decon & Move Drill onsite 0745-0845 Load water & move service truck on site Setup 0845-0955 Drill 0955-1230 Lunch 1230-1300
		P. GRAY. 2	100			
		BEN. 2	100		gray Lt brown, fine SAND: trace to some silt; damp	
		SD. 2	100		Below 9', slightly darker & moist (more brown, no gray)	
		P. GRAY. 2	100			
22		BEN. 2	100		Scattered 1/8" beds silty f. sand	Bevel & Add casing 1020-1115 No LEL detected
					Silty sand beds increases in thickness & frequency w/ depth < 1/2"	



PROJECT NUMBER SEA 24607.D1	BORING NUMBER KGP-41	SHEET 2 OF
SOIL BORING LOG		

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START 10/3/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6'-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
30					Trace of fine gravel below 30'	
32.5		G1 @ 33	BEN		Gravel coarser below 32'	
37		G2 @ 38	SD		Brn gray, gravelly SAND: some silt; damp	
4					Brn gray, gravelly SILT/silty GRAVEL: some fine sand; moist Decreasing gravel content and increasing sand " w/depth.	
					Brn gray, gravelly SAND: some silt; damp to moist; most gravel is fine, few clasts > 1"	
48			P. GRAVEL		Scattered ± 1/4" beds of silt below 47'	
					Brn gray, SILT: some fine sand to sandy; moist.	
50					Brn gray silty SAND: some gravel; moist except clasts coated w/water	
54	5				Below 53 grades gravelly & wet	
		G3 @ 56	SD		Brn gray, sandy GRAVEL: trace to some silt; saturated;	
			BEN		waterbearing below 58'	
60					scattered cobbles	Casing @ 58.5'; water level @ 50.25' after purging w/air & removing hammer 50.0 after 5 min 49.5 after 25 min



PROJECT NUMBER

BORING NUMBER

SHEET 4 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/4/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
90					Gray, clayey SILT as above w/ trace of sand & widely scattered subangular to well rounded fine gravel	on site 0745 - No water, No LEL Move casing to rig, bevel weld 0745 - 0915; Drill 0915 - 1000; Weld casing 1000 - 1040; Drill 1040 - 1110; add rod; Weld casing 1110 - 1200 Drill 1200 - 1230 Weld 1230 - 1300
10						
115					Gray, silty CLAY: sl. plastic; moist	
120						



PROJECT NUMBER

BORING NUMBER

SHEET 5 OF

SOIL BORING LOG

PROJECT LOCATION

ELEVATION DRILLING CONTRACTOR

DRILLING METHOD AND EQUIPMENT

WATER LEVELS START 10/4/91 FINISH LOGGER

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
127			GRAVEL			Cuttings show a trace of dark medium sand (widely scattered) - 2%
133			PEA		Gray, clayey SILT: some fine to med sand; trace coarse sand; trace gravel; moist	
			BEN.			Difficult driving ↓



PROJECT NUMBER
SEA 24607.81

BORING NUMBER
KGP-41

SHEET 7 OF

10-4-91

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/4/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
190			P. GRAVEL		OPEN HOLE	Cuttings are gray sandy SILT trace coarse sand & fine grav; few small pieces organic debris, wood frags, coal frags. Bit at 190
					Bottom of hole @ 190 feet. on 10/4/91 See SHEET 10 FOR REMAINDER OF LOG.	Discussed progress w/Tom Kraemer. To go deeper, our option is to install 6" casing. We will blow out as much water this p.m., then take water measurement first on Monday 10-7 & call him w/results. He'll decide at that time whether to proceed w/deep installation. Driller blew out as much cuttings as possible. Making air as rods pulled. Water Level @ 133.5 @ 1635, but Hole Sloughed or heaved to 139 when rods & bit pulled. Discussed situation w/T.K. We'll bail hole & install piezo instead of gas probe. (see sheet 8)



PROJECT NUMBER SEA 24607.81	BORING NUMBER KGP-41	SHEET 8 OF
SOIL BORING LOG		

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START 10/7/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
					When rods pulled, hole was open to 149.6'. Air could be heard bubbling into hole and felt coming out of casing. No LEL measured or below detect limits of instrument.	Drillers on site 0745. Clean out plugged bit & rods, trip rods in attempt to clean out hole below 138'. bit plugged; pulled rods, cleaned bit & tripped rods. Hole cleaned out to 165'. Casing jacks installed 1105 to 1200. Lunch 1200-1230 Load pea gravel & supplies 1230-1315 Install piezo 1315-1530 Jack casing At 1530 2 hydraulic hoses broke; repair hydraulics 1530 to 1700 Discussed progress w/Tom Kraemer of CH2M Hill He wants to reduce to 6" casing & deepen hole below 190, attempting to penetrate the silt unit & reach the underlying sand. He will discuss costs w/Tacoma Pump

PROJECT NUMBER <i>SEA 24607.B1</i>	BORING .BER <i>KGP 41</i>	SHEET <i>9</i> OF
SOIL BORING LOG		

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START 10/8/91 FINISH _____
LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						Driller on site 0800 Repaired Hydraulics Cut off shoe from 8" casing Weld up & install 6" to 138'; same as 8" in ground. Drillers off site @ 0730



PROJECT NUMBER <i>SEA 24607. B1</i>	BORING <i>KGP-41</i>	ABER <i>SHEET 10 OF</i>
SOIL BORING LOG		

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START *10/9/91* FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
<i>70</i> 194			<i>P. GRAVEL</i>		Hard, gray, sandy SILT: sand fine to medium; trace coarse sand; trace organics, mostly as fine wood fragments & coal	Remove casing, jacks & timbers. Add rods, weld 6" casing - 0923
197					Brown gray (silt) to gray (sand), silty fine SAND: trace to some med sand; trace fine organic debris; waterbearing	Drill & blow out cuttings/pea gravel to 160' 0924-0937 Add rods, weld 6" casing 0937-1015 Drill & blowout cuttings to 178' 1015-1045 Add rods, weld 6" casing 1045-1120 Drill to ^{198'} 1120-1200 Plugged bit & rods; tripped rods, cleaned out sand Lunch 1220-1250 Loaded rods, found 20' of heave, cleaned out & tripped rods 1250-1440 Installed piezo @ 194.5, 15' of screen 1440-1735 At ± 1735 Helper was bumped off utility truck while loading 20' piece of 6" casing; landed on left ankle. Sprain or poss. break Off site @ 1605



PROJECT NUMBER

SEA 24607. D1

BORING NUMBER

KEP-41

SHEET 12 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

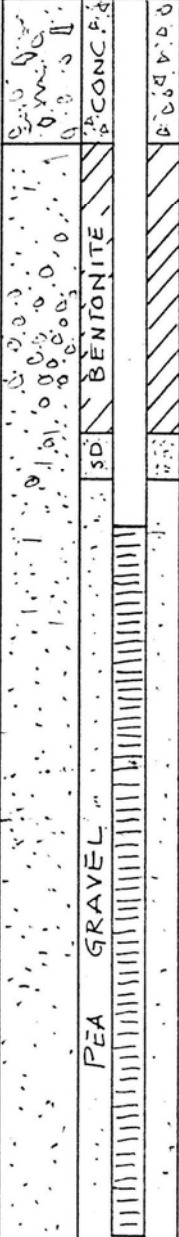
DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10-11-91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						LEL = 4.2% in open hole before drilling & probe installation began Drillers on site @ 0745 Moved 6" casing to storage " jacks & timbers " " Drop tower & move drill forward, put man cover over probes (will concrete in & complete installation on 10/14/91) Hydrated bentonite in boring before placing monument, no LEL detected Water level in piezo is 145.0 LEL in Lower Probe = 0.5% " " Upper " = 10% Steam Clean Rig/Casing - 1110 10-14-91 144.5 Water level in piezo = 136.0 LEL in Lower Probe = 0.1%

SOIL BORING LOG

PROJECT KENT HIGHLANDS LANDFILL GAS PROBE INSTALLATION LOCATION KENT
ELEVATION ± 278 DRILLING CONTRACTOR TACOMA PUMP
DRILLING METHOD AND EQUIPMENT AIR ROTARY
WATER LEVELS AS SHOWN ON LOG START 10/15/1976 FINISH 10/16/76 LOGGER R. E. FAUBION

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
3					Gray brown, gravelly SAND: some organic debris - wood; damp (FILL)	Decon 0900 - 1000 Move to site 1015-
					Lt brown, fine SAND: trace silt; some gravel to gravelly below 6' to 8'; less below; damp.	
					no gravel below 10' to	
					Moist below 21'	

PROJECT NUMBER
SEA 24607.131BORING NUMBER
KGP-42

SHEET 2 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/16/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
				P.G.	Light brown, fine SAND as above: trace of silt; trace of fine gravel; moist Slightly higher moisture content below 43'	
				BENT.		
				SAND		
48				"PEA GRAVEL"	Brown gray, gravelly, fine to coarse SAND; some silt; gravel mostly fine, 5-10% > 1"; sub angular to rounded; wet	Drill action rough below 53'
53				SAND	Gray, sandy GRAVEL; some silt; some large gravel; wet; clasts below 55' water coated	
56				BENTONITE	Brown (silt) to gray (sand), gravelly SAND grading downward to sandy GRAVEL below 59'; some silt to silty; water bearing.	



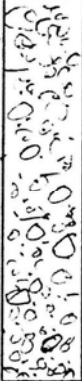
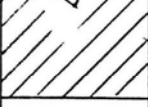
PROJECT NUMBER
SEA 24607. B1

BORING NUMBER
KGP-42

SHEET **3** OF

SOIL BORING LOG

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START 10/16/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
68						Drill action very rough below 62 (most clasts broken by bit.)
					Gray SILT: trace of clay; nonplastic, moist.	
						Cased to 78 feet; drilled open to 83 feet
84						
					Bottom of Boring @ 84	

GH²PROJECT NUMBER
SEA 24607.131BORING NUMBER
KGP-43

SHEET 1 OF

SOIL BORING LOG

PROJECT KENT HIGHLANDS GAS PROBE INSTALLATION LOCATION KENT HIGHLANDS LANDFILL
ELEVATION +274 DRILLING CONTRACTOR TACOMA PUMP
DRILLING METHOD AND EQUIPMENT AIR ROTARY
WATER LEVELS AS SHOWN START 10-27-91 FINISH 10-2-91 LOGGER R.F. FAUBION

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" S M D	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
3.0		G1 @ 4.0			Brown gray, silty fine SAND; dry to moist w/depth some interbedded sandy Silt & brown sand (FILL)	KGP 39 Gas meas. @ 1030 39U Scr 10-20 0% 39M 35-55 0% 39D 120-160 70%
					Brown gray, silty fine SAND; damp; scattered thin beds of moist silt grades slightly coarser with depth; moist below 10-12 ft.	Decon & move onsite 0920-1030 Setup 1030-1110 Drill 1110-1140 Fasten Discharge hose & Bevel Casing 1140-1215 Lunch 1215-1245 Weld casing 1245-1320 Drill 1320 -
		G2 @ 8				No Gas Detected - casing @ 18' 1140 No GAS Detected after lunch (1245) prior to welding casing



PROJECT NUMBER
SEA 24607. B1

BORING NUMBER
KGP-43

SHEET 2 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" W D	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
30					Grades finer below ±30	Drill 1320 - 1342 Add pipe & weld 1342 - 1400 Drill 1435 - 1500 Add pipe & weld 1500 - 1545 Drill 1550 - 1630 Add pipe & drill weld 1630 - 1700 Drill 1700 - 1725 Cleanup 1725 - 1740 offsite NO GAS DETECTED PRIOR TO WELDING CASING AT 1353
50				PEA & GRAVEL		
60				BENTONITE	Brown to gray brown, silty fine SAND: <u>wet</u> Saturated below 53	Casing @ 57, water level meas. @ 51.6' 1515 No Gas Detected " Vap or Gas Detected



PROJECT NUMBER
SEA 24607.B1

BORING NUMBER
KGP-43

SHEET 3 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
61		G4 @ 63		BENTONITE	Gravel @ 61- (fine, well rounded) Brn gray, fine Sandy SILT; some fine Gravel wet to saturated (comes out of air discharge in sloppy blobs	
66		G5 @ 69		SAND	Gray, silty, fine SAND/fine sandy SILT; some fine gravel; damp to moist (Drift?) Grades increasing gravel with depth	
75?					Larger Gravels 75'-	Drill Action Rough
76		G6 @ 79		PEA GRAVEL	Dense to v. dense Gray, sandy, silty GRAVEL/ silty, gravelly SAND; moist (Drift?) 74-82 Larger gravel water bearing or seepage from above contact	
87					Gray, clayey SILT; moist to wet	Casing @ 89 over weekend water level = 79'



PROJECT NUMBER

SEA 24607.B1

BORING NUMBER

KGP-43

SHEET 4

OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
10						
20						
30						
40						
50						
60						
70						
80						
90						
100						
110						
120						
130						
140						
150						
160						
170						
180						
190						
200						
210						
220						
230						
240						
250						
260						
270						
280						
290						
300						
310						
320						
330						
340						
350						
360						
370						
380						
390						
400						
410						
420						
430						
440						
450						
460						
470						
480						
490						
500						
510						
520						
530						
540						
550						
560						
570						
580						
590						
600						
610						
620						
630						
640						
650						
660						
670						
680						
690						
700						
710						
720						
730						
740						
750						
760						
770						
780						
790						
800						
810						
820						
830						
840						
850						
860						
870						
880						
890						
900						
910						
920						
930						
940						
950						
960						
970						
980						
990						
1000						

Driller adding water
to remove cuttingsAt 97, No methane
detectedAdd and weld casing
0920 - 0955

PEA GRAVEL

-- D.C. "Different Material"
Note: cuttings same clayey SILTReel,
Add & weld casing
1030 - 1130
No Methane detected
Total Ionizable Gas = 4.1 - 5.0 ppm



PROJECT NUMBER

SEA 24607.131

BORING NUMBER

KGP-43

SHEET

5

OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
0						
30						
0						
50						
				PEA GRAVEL	Hard stiff , gray, clayey SILT; trace sand & fine gravel; sl. plastic; moist.	Driller still adding water to remove cuttings. No Methane Detected Lunch 1230 - 1300 Load & move ^{weld} casing 1300 - 1415 Drill 1415 - 1505 Load casing 1505 - 1545 Get H ₂ O Bevel, weld casing 1545 - 1630 Drill 1630 -

BORING NUMBER

SEA 24607. B1

KG P-43

SHEET 6

OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT

WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
170			PEA GRAVEL			
173					Very stiff to Hard, sandy SILT. trace ^{clay} fine gravel, 4 4 pieces of wood frags (sawdust size)	D.C. "Making its own water" off site 1850
175						

BCH (8.30) 180



PROJECT NUMBER
SEA 24607. B1

BORING NUMBER
KGP-43

SHEET 7 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						8:00 - 10:30 Down for rig repair 0930 per driller
						16:30 WL 151.3 casing - 3.5 SU
						No Gas - 0% LEL
						12:25 - 1st 20' pulled & back filled
						100 - 200 2nd 20' section pulled & back filled (5' of bentonite after 20')
						2:45 60' out. 0.02% LEL
						3:15 80' out 0% LEL
						3:30 - 90.7' adding Bentonite
						3:45 Very difficult to pull casing at 85'
						4:30 100' casing pulled, bentonite to 76' 0% LEL
						Gravel to 75.6 *
						Gravel filter to 75.5.
						Casing pulled back to 67'
						5:30 EOD

Driller pulled back to high point 1/2 ft of gravel out of bentonite and set probe
* Driller mis measured - tip at 76'.



PROJECT NUMBER
SEA 24607.B1

BORING NUMBER
KG1P-43

SHEET 8 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						▽ 50.6 before starting shift No LEL Detected Full casing & install probes 0830 - 1225 Lunch - 1225 - 1305 Full casing & install probes 1305 - 1339 Load jacking collar, jacks & timbers, offload 1339 - 1410 1410 - 1445 ▽ in deep probe 53.3 - 2.2 = 51.1 LEL in shallow when initial opened 3.1% in mid 1.2% read @ 1410 ▽ in mid probe = 48.3 ▽ " shallow " = NONE Install monument, 1445 - 1450 tthread & install caps & valves Load casing, decon 1600 - 1730



SEA 24607-B1

PROJECT NUMBER

BORING NUMBER

KGP-44

SHEET

1

OF

SOIL BORING LOG

OBJECT KENT HIGHLANDS LANDFILL GAS PROBELOCATION KENTELEVATION 285DRILLING CONTRACTOR TACOMA PUMP & DRILLINGDRILLING METHOD AND EQUIPMENT AIR ROTARY

WATER LEVELS

START

10/11/91
1130

FINISH

LOGGER R.F. FAUBION

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
2.0					Lt brown, gravelly SAND: dry (FILL)	Moved on site 1130 Set up 1130-1215 Lunch 1215-1230 Continue setup, weld shoe on casing, bevel, etc 1300-1400 Drill 1400-
7.0					Lt brown, ^{fine to} medium SAND: trace silt, moist moist	
11.0					Grades siltier below 5'	
19.0					wet & some gravel below 7-8' gravel mostly fine (pea gravel size, but contains scattered rounded clasts to one inch ϕ)	At 8-9 casing off vertical Picked & straightened
23.0					Larger gravel @ 11', numerous flakes from cuttings	Drill action rough
27.5					Lt brown, sandy fine GRAVEL; some coarse gravel; trace silt; moist to wet (water bearing?)	
29.5					W.D.S. Brown gray to gray, gravelly SAND; some silt to silty; nonplastic; moist; Gravel fine; widely scattered clasts > 1"; (Drift?)	Drillers off site @ 1650 10-14-91 Drillers on site @ 0730 No WEN Detected 7-8' water in hole Drill 0840-0915
					Gray brown, sandy Gravel; some silt; clasts subangular to subrounded; wet; grades to gravelly ^{fine med} SAND with some silt below 27; wet	Discussed progress with Tom Kraemer, CH2MHILL. He wants to drill in to silt unit far enough to confirm. Elim. lower probe.
					Gray, sandy GRAVEL: trace to some silty moist	
					Gray brown, gravelly ^{fine med} SAND: trace silt; gravel (8.5) fine; trace clasts > 1" moist	



PROJECT NUMBER
SEA 24607. B1

BORING NUMBER
KGP-44

SHEET 2 OF

SOIL BORING LOG

SUBJECT _____ LOCATION _____
ELEVATION _____ DRILLING CONTRACTOR _____
DRILLING METHOD AND EQUIPMENT _____
WATER LEVELS _____ START 10/14/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
30						
33					Gray, sandy, fine GRAVEL; trace to some silt; moist; clasts sub- angular to well rounded; visible moisture on clasts; (Drift?) Very silty from 37 to 47	Drill 1018 - 1050 Approx 1-2 gal of water blown out of hole after welding casing
55					Less silt below 47 Sand is medium to coarse	
59					Gray, sandy, well graded GRAVEL; trace to some silt; clasts are wet saturated to water bearing (8.30)	Add rod, weld casing 1050 - 1140



PROJECT NUMBER
SEA 24607.B1

BORING NUMBER
KGP-44

SHEET 3 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/14/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
60						
63						
68.0						
74.0						
80						
88.6						
90						



PROJECT NUMBER
SEA 24607.31

BORING NUMBER
KGP -44

SHEET 4 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/15/91 FINISH 10/16/91 LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						Water level = 42.8' below ex. grade at start of shift Lunch 1200-1230 Completed probe install ation @ 1600 No LEL Detected in either of the 2 probes No water in upper probe Water @ 30.2 in Mid Probe 10/16/91 No LEL Detected in either Probe Water @ 31.2' in Mid Probe 10/19/91 Water @ 34.7 in Midprobe 1600



PROJECT NUMBER
SEA 24807.B1

BORING NUMBER
KGP-45

SHEET 1 OF

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas Probe LOCATION Kent, Wa.
ELEVATION _____ DRILLING CONTRACTOR Tacoma Pump & Drilling
DRILLING METHOD AND EQUIPMENT Air Rotary
WATER LEVELS _____ START 10/19/91 FINISH _____ LOGGER PNW

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
1					Light Brown Gravelly Fine SAND Occ. roots - (Fill) Dry	Decon 800 - 1000 Moved on site 10:10 Setup 10:10 - 10:45
9					Lt Brown Fine SAND, Trace silt Damp Some Fine to med. rounded gravel 7-9'	
12					Lt Brown gravelly Fine to med. SAND. Trace silt Damp	
					Lt Brown Fine SAND Trace silt, Trace gravel Damp	
20					Lt Brown Fine SAND Trace silt Damp no Gravel after 20'	



PROJECT NUMBER
SEA 24607.81

BORING NUMBER
KGP-45

SHEET 2 OF

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas Probe LOCATION Kent, Wa.
ELEVATION _____ DRILLING CONTRACTOR Tacoma Pump & Drilling
DRILLING METHOD AND EQUIPMENT Air Rotary
WATER LEVELS _____ START 10/19/91 FINISH _____ LOGGER PNW

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
30				6"-6"-6" (N)		
				BENTONITE	Light Brown Fine SAND Trace silt damp	
				SAND		
50				PEA GRAVEL	becoming silty, moist	
53				P. GRAVEL BENT. 50-50 MIX	Light Brown silty Fine SAND moist to wet making H ₂ O at 58'	

PROJECT NUMBER
SEA 24607.B1BORING NUMBER
KGP-43

SHEET 3 OF

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas Probe LOCATION Kent Wa
ELEVATION _____ DRILLING CONTRACTOR Tacoma Pump & Drilling
DRILLING METHOD AND EQUIPMENT Air Rotary
WATER LEVELS _____ START 10/19/91 / 10/21, FINISH _____ LOGGER PJW / R.F. Fambien

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
60						
65	65		20.0		Light Brown Silty fine SAND, Moist to Wet 63' trace of gravel	
			0.0		Brownish Gray, silty GRAVEL; some sand; some coarse gravel wet	
72	72		10.0		Gray silt some sand, some gravel wet to moist.	
			10.0			
83			10.0		Silt is brown, sand & gravel gray sandy GRAVEL: some silt; gravel is predom. coarse (most clasts broken by drill-drill action very rough); water bearing	10/21/91 Over weekend water level @ 55.0'
87			10.0		Brown (silt) gray, gravelly SAND: some silt; grades less gravel w/depth gravel is finer; water bearing	Driller blew water out of hole; large volume of air & water comes up outside casing
90			10.0		contains numerous pebble size fragments & scattered pieces organic frags	1825-0930 Add casing



PROJECT NUMBER
SEA 24607.131

BORING NUMBER
KGP-45

SHEET 4 OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/21/91 FINISH _____ LOGGER _____

90

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
102				PEA GRAVEL/BENTONITE 50-50 MIX	Brown gray gravelly SAND as above; sand heaves	Drillers on site @ 0740 Drill 0930-1000 Add casing Clean out heave 1035-1130 * Add casing 1130-1220 Drill 1220-1330 Lunch 1330-1400 Trip rods & install jacks 1400 -
					Trace to some gravel below 93'	
					higher gravel content (15-20%) below 98'	* After getting additional casing from stockpile, driller found sand had heaved approx. 25' in- side casing.
					Gray brown to brown gray, sandy GRAVEL: some silt; gravel is fine to coarse; water bearing; larger clasts below 104	Drill action very rough 104 - 110
					Trace trace large gravels below 110	
112					Gray SILT: trace of clay; nonplastic; moist.	
119					Bottom of Boring @ 119	

110

120

SHEET 4 OF 4

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT

WATER LEVELS _____ START 10/22/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
				6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						Drillers onsite 074 Continue probe installation to 1520 Install monument & clean up 1520- No LELs detected No water in probe 36 days interval 1. 1. 2010 2. 2. 2010 3. 3. 2010 4. 4. 2010 5. 5. 2010

LOG OF KGP 45

- 0-1 Lt Brown, gravelly fine SAND: occasional roots; dry. (FILL)
- 1-9 Light brown, fine SAND: trace of silt; damp. Some fine gravel 7-9 ft.
- 9-12 Lt brown, gravelly, fine to medium SAND: trace of silt; damp.
- 12-20 Lt brown, fine SAND: trace of silt & gravel; damp.
- 20-53 Lt brown, fine SAND: trace of silt; damp. becoming silty & moist below 49 ft.
- 53-65 Lt. brown, silty, fine SAND: moist to wet. Makes water below 58. Trace of gravel at 63 ft.
- 65-72 Brown gray, sandy, silty GRAVEL: some coarse gravel; wet
- 72-83 Gray, SILT: some sand & gravel; wet to moist
- 83-87 Brown(silt) to gray(sand) sandy GRAVEL: some silt; gravel is predominately coarse (most clasts broken by drill; drill action very rough); waterbearing.
- 87-102 Brown(silt) to gray(sand), gravelly SAND: some silt; grades less gravel with depth; gravel is finer; waterbearing. Contains numerous pebble size ($\frac{1}{4}$ " - $\frac{1}{2}$ ") pumice fragments; scattered pieces of organic fragments(carbon?) Sand heaves. Trace to some gravel below 93 ft.; higher gravel content (15-20%) below 98 ft.
- 102-112 Gray brown to brown gray, sandy GRAVEL: some silt; gravel is fine to coarse; waterbearing; larger clasts below 104 ft.
- 112-119 Gray SILT: trace of clay; nonplastic; moist.

Boring cased to 116

Perched water at 55 - 58 ft.

KGP - 45

MONUMENT

0-3	CONCRETE
3-10	BENTONITE
10-11	10-20 COLORADO SAND
11-27	PEA GRAVEL
0-12	SOLID THREADED SCH. 80 PVC $\frac{3}{4}" \phi$
12-26	SLOTTED " " " " "
27-29	PEA GRAVEL
29-39	BENTONITE
39-40	SAND
0-40	SOLID PVC
40-50	SLOTTED "
50-55	PEA GRAVEL
55-119	BENTONITE/PEA GRAVEL 50-50 MIX

30316 MOUNTAIN HIGHWAY • GRAHAM, WASHINGTON 98338 • PHONE 847-9352

DATE: 01-18-91
DRILLER: J. J. J. J.
WELL I.D.: 46145
START TIME: 7:00
FINISH TIME: 4:00

CLIENT: CH²M 111
LOCATION: Kent Highland
SIZE: 38
START DEPTH: 0
FINISH DEPTH: 84'

REMARKS: 1 intermobe
1st 15 min. Homely
84 footage.

DRILLER: [Signature]
OILER: [Signature]
RIG: 4
CONSULTANT: [Signature]
for MDA

30316 MOUNTAIN HIGHWAY • GRAHAM, WASHINGTON 98338 • PHONE 847-9352

DATE: Oct 24 1990
DRILLER: J. A. Williams Jr
WELL I.D.: R6P 45
START TIME: 230
FINISH TIME: 530

DRILLER: 12-2-2014
OILER: 12-2-2014
RIG: 12-2-2014
CONSULTANT: 12-2-2014

30316 MOUNTAIN HIGHWAY • GRAHAM, WASHINGTON 98338 • PHONE 847-9352

DATE: Oct 22, 91 (Tuesday)
DRILLER: Timothy H. H. H. H.
WELL I.D.: K6P 45
START TIME: 720
FINISH TIME: _____

DRILLER: John H. H. H. H.
OILER: John H. H. H.
RIG: John H. H. H.
CONSULTANT: Paul H. H. H.



PROJECT NUMBER
SEA 24607.B1

BORING NUMBER
KGP-46

SHEET 1 OF 4

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas Probe

LOCATION Kent, wa

ELEVATION 283

DRILLING CONTRACTOR Tacoma Pump & Drilling

DRILLING METHOD AND EQUIPMENT Air Rotary

WATER LEVELS START 10/23/91 FINISH LOGGER PNW

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
0						
3					Light Brown Fine to med SAND Some gravel Trace Silt. occ. Roots (Fill) Dry to Damp	Decom 745 - 830 Set up 830 - 950
					Light Brown Fine sand Trace gravel Trace silt Damp	
					SD	
					increase gravel 12'-13'	
19						
22					Brownish Gray Silty gravelly SAND Moist	10.45 Add casing NO LEL Detect
27					Grayish Brown silty Sandy Fine to coarse GRAVEL Moist Gravel - Fine to coarse, rounded	
30					Brown silty gravelly Fine to med SAND Damp	



PROJECT NUMBER

BORING NUMBER

KGD-46

SHEET 2

OF 4

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas ProbeLOCATION Kent, WA

ELEVATION _____

DRILLING CONTRACTOR

Tecoma Pump & Drilling

DRILLING METHOD AND EQUIPMENT

Air Rotary

WATER LEVELS _____

START 10/23/91

FINISH _____

LOGGER PNW

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	LOGGER PNW
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS
						DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30					Brown Fine to Med. SAND Trace Gravel, Trace Silt Damp	
33 1/2					Brown sandy silty GRAVEL moist	
37					wet	
39					Brown silty Fine to Coarse SAND Trace to some gravel Wet becoming moist w/ Depth.	WL - 10/25/91 1200 - Lunch 1230 - Add Casing NO LEL Detect
42					less silty 45' to 48'	
45					Gray silty Sandy Gravel Trace clay Moist (Till?)	Rig Chatter. hard driving casing
48						
51						
54						
57						
60						
63						
66						
69						
72						
75						
78						
81						
84						
87						
90						
93						
96						
99						
102						
105						
108						
111						
114						
117						
120						
123						
126						
129						
132						
135						
138						
141						
144						
147						
150						
153						
156						
159						
162						
165						
168						
171						
174						
177						
180						
183						
186						
189						
192						
195						
198						
201						
204						
207						
210						
213						
216						
219						
222						
225						
228						
231						
234						
237						
240						
243						
246						
249						
252						
255						
258						
261						
264						
267						
270						
273						
276						
279						
282						
285						
288						
291						
294						
297						
300						

WL - 10/25/91

12:00 - Lunch
12:30 - Add Casing
No LEL DetectRig Chatter.
hand driving casingNo LEL Detect
2:15 Add casing

PROJECT NUMBER
SEA 24607.81BORING NUMBER
KGP-46

SHEET 3 OF 4

SOIL BORING LOG

PROJECT Kent Highland Landfill Gas Probe LOCATION Kent, Wa
ELEVATION _____ DRILLING CONTRACTOR Tacoma Pump & Drilling
DRILLING METHOD AND EQUIPMENT Air Rotary
WATER LEVELS _____ START 10/23/91 FINISH 10/25/91 LOGGER PNW

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
60					Gray silty sandy GRAVEL Trace Clay Wet	Rig chatter hand driving casing
64				50/50 Bentonite / Pea gravel	Gray Gravelly Fine to Coarse SAND - Some silt wet	
69					Gray clayey SILT moist - trace sand	
70				Bentonite		
80						
84						8:00 10/25/91 - start pulling casing - No Gas Detected WL - 70' after pulling first section:
90						

PROJECT NUMBER
SEA 24607. B1BORING NUMBER
KGP-46

SHEET 4 OF 4

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START 10/28/91 FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)			
						On site 0800 Drillers on site 0740 Jump start drill rig to 0810 Thread & install top sections of PVC Decom equipment Repair Air Brakes (replace connector hose) on utility hose 1130-1230. Offsite @ 1330. Driller will obtain threaded Coupling/Valve system this PM or 10/29 AM & bring to site. Will install valves & paint. Monuments will be painted when weather permits.

Figure A-1

RECORD OF BOREHOLE MW-6

LOCATION See Figure

DATUM 325 Ft. (approx.) DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES		ELEVATION	STANDARD PENETRATION TEST ▲ "N" BLOWS PER FOOT		GROUNDWATER WELL INSTALLATION	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FT.	WATER CONTENT, PERCENT		
							Wp		Wn
325 0.0	Dark brown; silty fine to coarse SAND, trace gravel.		1	AR	325				
320 5.0	Gray-brown to dark brown; silty, fine to coarse GRAVEL and fine to coarse SAND.		2	AR	320				
	10.0-15.0: Grades to GRAVEL and SAND, some silt.				315				
			3	AR					
310 15.0	Dark gray-brown to dark brown; fine to coarse GRAVEL and fine to coarse SAND, trace to some silt.		4	AR	310				
			5	AR	305				
			6	AR	300				
		7	AR	295			Pea gravel		

6" Steel locking surface casing

Cement grout

4" Solid Sch. 80, flush coupled, threaded PVC casing

Pea gravel

REMARKS: AR - Air rotary drill

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

RECORD OF BOREHOLE MW-6

LOCATION See Figure

DATUM 325 Ft. (approx.) DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES			STANDARD PENETRATION TEST ▲ "N" BLOWS PER FOOT				GROUNDWATER WELL INSTALLATION		
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FT.	ELEVATION	WATER CONTENT, PERCENT					
							Wp	Wn	WL			
	Dark gray-brown to dark brown; fine to coarse GRAVEL and fine to coarse SAND, trace to some silt.		7	AR		290						
			8	AR		285						
			9	AR		280						
			10	AR		275						
			11	AR		270						
270 55.0	Dark brown; fine to medium SAND, trace gravel.		12	AR		265						
265 60.0	Dark gray; silty SAND, trace gravel and clay.		13	AR		260						
260 65.0			14	AR		260						

4" Solid
Sch. 80, Flush
coupled,
threaded
PVC casing

Pea gravel

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

RECORD OF BOREHOLE MW-6

LOCATION See Figure

DATUM 325 Ft. (approx.) DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES			STANDARD PENETRATION TEST				GROUNDWATER WELL INSTALLATION
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FT.	ELEVATION	"N" BLOWS PER FOOT			
							WATER CONTENT, PERCENT			
							Wp	Wn	WL	
	Dark gray; fine to coarse GRAVEL and fine to coarse SAND, some to trace silt.		14	AR		255				
			15	AR		250				
			16	AR		245				
			17	AR		240				
			18	AR		235				
	90.0 to 95.0: Grades to sandy medium to very coarse GRAVEL, trace silt.		19	AR		230				
			20	AR		225				
			21	AR						

4" Solid,
Sch. 80, Flush
coupled,
threaded
PVC casing

Pea gravel

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

Figure A-1

RECORD OF BOREHOLE MW-6

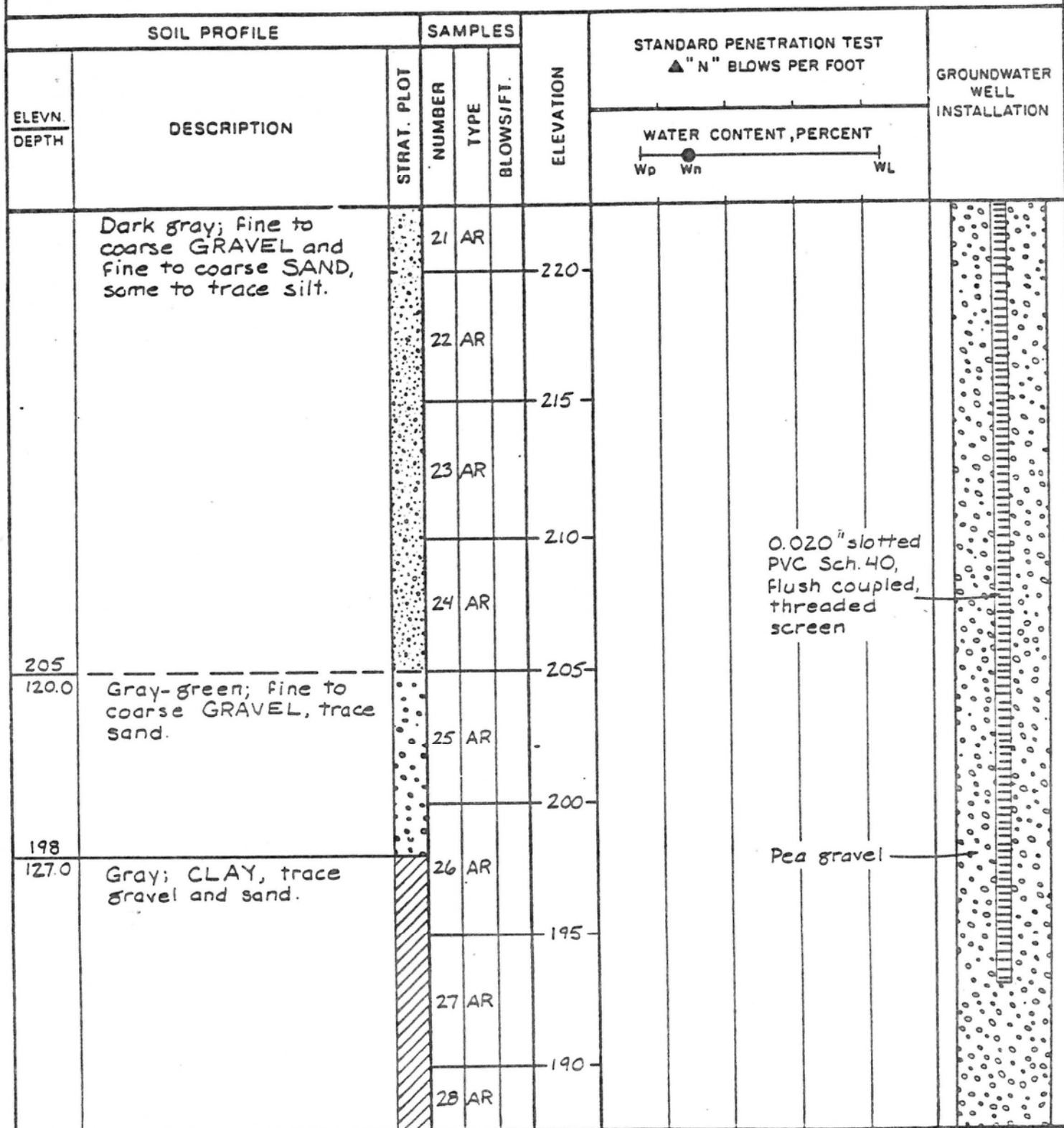
LOCATION See Figure

DATUM 325 Ft. (approx.)

DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill



REMARKS:

VERTICAL SCALE
1 IN TO 5 FT.

Golder Associates

JOB # 853-1003

Figure

RECORD OF BOREHOLE MW-6

LOCATION See Figure

DATUM 325 Ft. (approx.)

DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES		ELEVATION	STANDARD PENETRATION TEST ▲ "N" BLOWS PER FOOT			GROUNDWATER WELL INSTALLATION	
ELEVN. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FT.	WATER CONTENT, PERCENT			
							Wp	Wn		WL
	Gray; CLAY, trace gravel and sand.		28	AR	185				Pea gravel	
			29	AR	180				Bentonite seal	
			30	AR	175				Bentonite, cement and pea gravel	
			31	AR	170					
			32	AR	165					
			33	AR	160					
			34	AR	155					
			35	AR						

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

Figure A-1

RECORD OF BOREHOLE MW-6

LOCATION See Figure

DATUM 325 ft. (approx.)

DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES		ELEVATION	STANDARD PENETRATION TEST				GROUNDWATER WELL INSTALLATION	
ELEVN. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FT.	"N" BLOWS PER FOOT				
							WATER CONTENT, PERCENT				
150			35	AR							
175.0	Gray; CLAY and fine to very coarse SAND, some gravel.		36	AR	150						
				37	AR	145					
				38	AR	140					
140	Gray; silty CLAY, trace sand.		39	AR	140						
185.0				40	AR	135					
				41	AR	130					
130	Gray; CLAY, trace fine sand.		42	AR	130						
195.0						125					
						120					

Bentonite,
cement and
pea gravel

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

RECORD OF BOREHOLE MW-6

Figure A-1

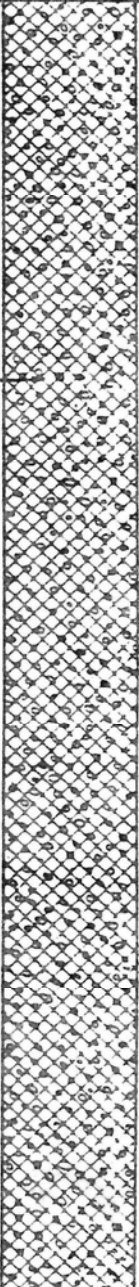
LOCATION See Figure

DATUM 325 Ft. (approx.)

DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES			STANDARD PENETRATION TEST ▲ "N" BLOWS PER FOOT				GROUNDWATER WELL INSTALLATION	
ELEVN. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FT.	ELEVATION	WATER CONTENT, PERCENT				
							Wp	Wn	WL		
	Gray; CLAY, trace fine sand.		42	AR		115					
			43	AR		110					
			44	AR		105					
			45	AR		100					
100											
225.0	Dark gray; silty CLAY to clayey SILT.		46	AR		95					
			47	AR		90					
			48	AR		85					
			49	AR							

Bentonite, cement and pea gravel

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

JOB # 853-1003

RECORD OF BOREHOLE MW-6

Figure A-1

LOCATION See Figure

DATUM 325 Ft. (approx.)

DATE 3-30-85

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD Air Rotary Drill

SOIL PROFILE			SAMPLES			ELEVATION	STANDARD PENETRATION TEST ▲ "N" BLOWS PER FOOT			GROUNDWATER WELL INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FT.		WATER CONTENT, PERCENT			
							Wp	Wn	WL	
80.	Dark gray; silty CLAY to clayey SILT.		49	AR		80				
245.0	End of Hole at 245.0 ft.									

Bentonite, cement and pea gravel

REMARKS:

VERTICAL SCALE
1 IN. TO 5 FT.

Golder Associates

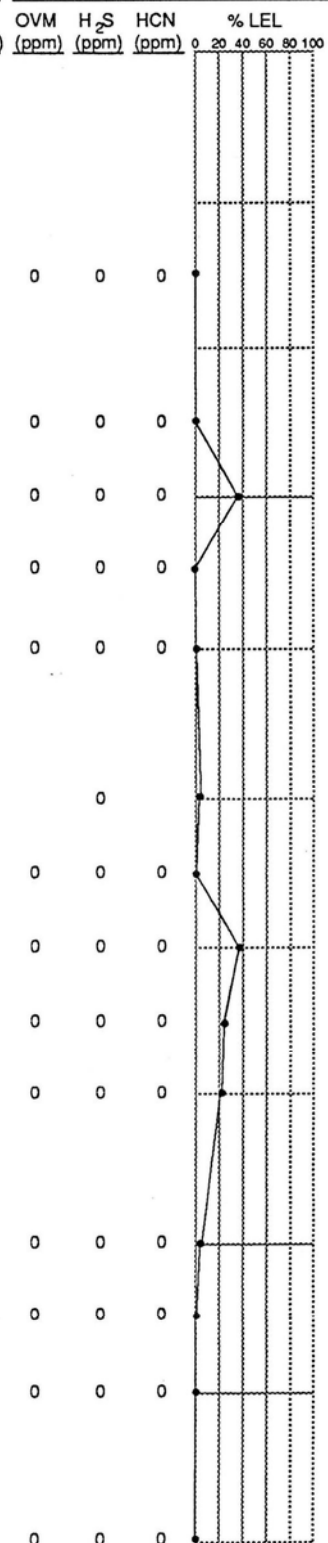
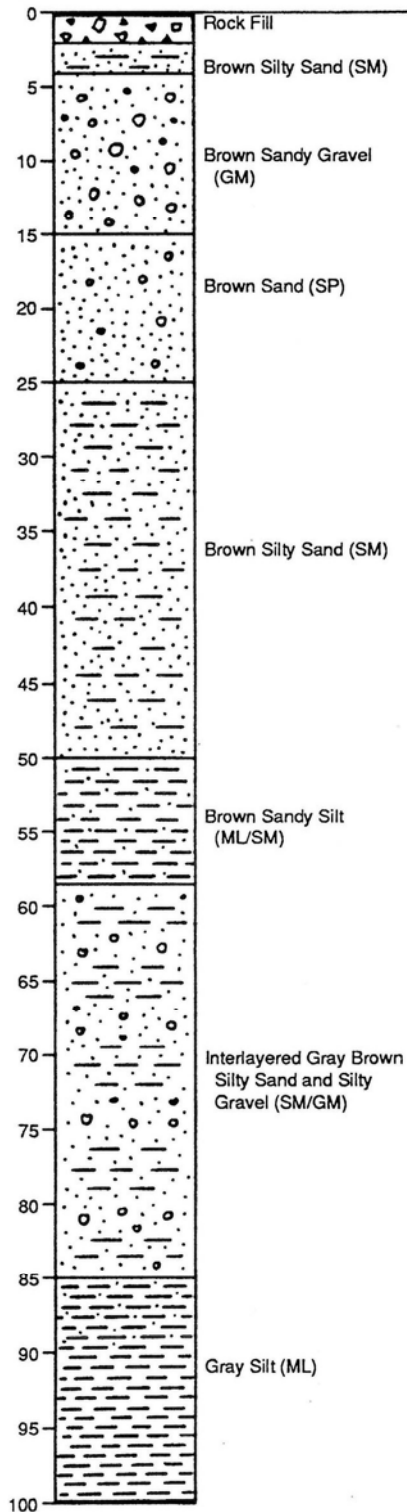
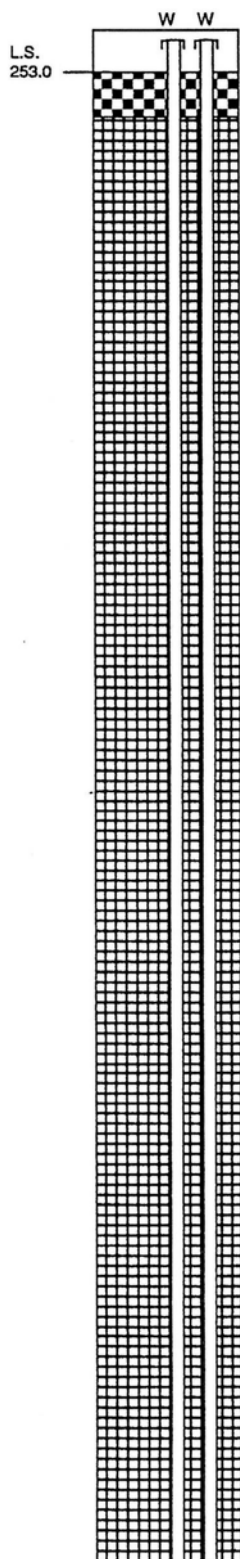
JOB # 853-1003

L.S.
253.0

Static Water <u>Level</u>	Drilling Water <u>Level</u>	Water- Bearing Zone
---------------------------------	-----------------------------------	---------------------------

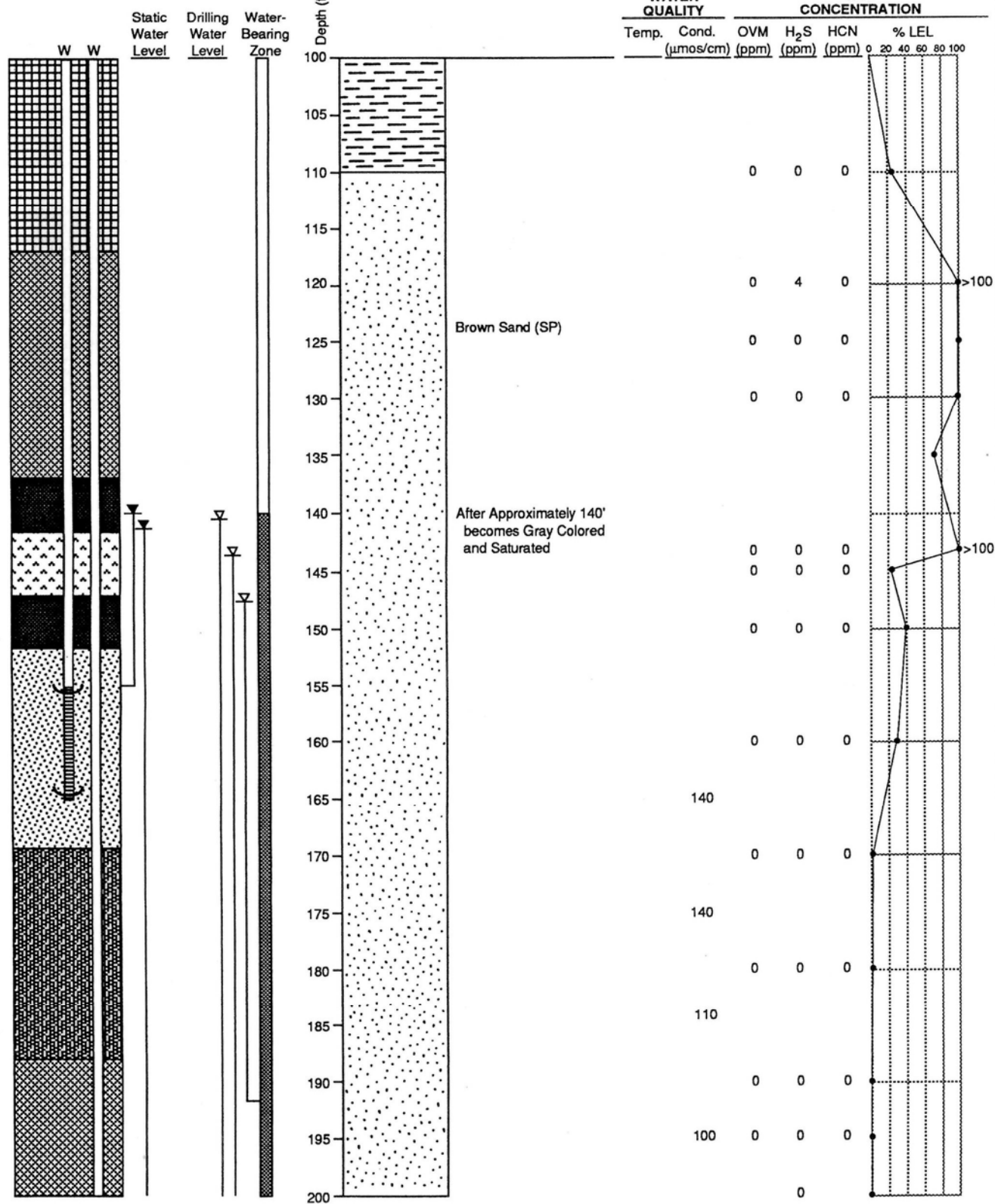
Note:
Detailed logs follow
summary logs.

WATER QUALITY		GAS CONCENTRATION					
Temp.	Cond.	OVM	H ₂ S	HCN	% LEL		
(μmos/cm)	(ppm)	(ppm)	(ppm)	(ppm)	0	20	40 60 80 100



KMW7/1

FIELD MEASUREMENTS

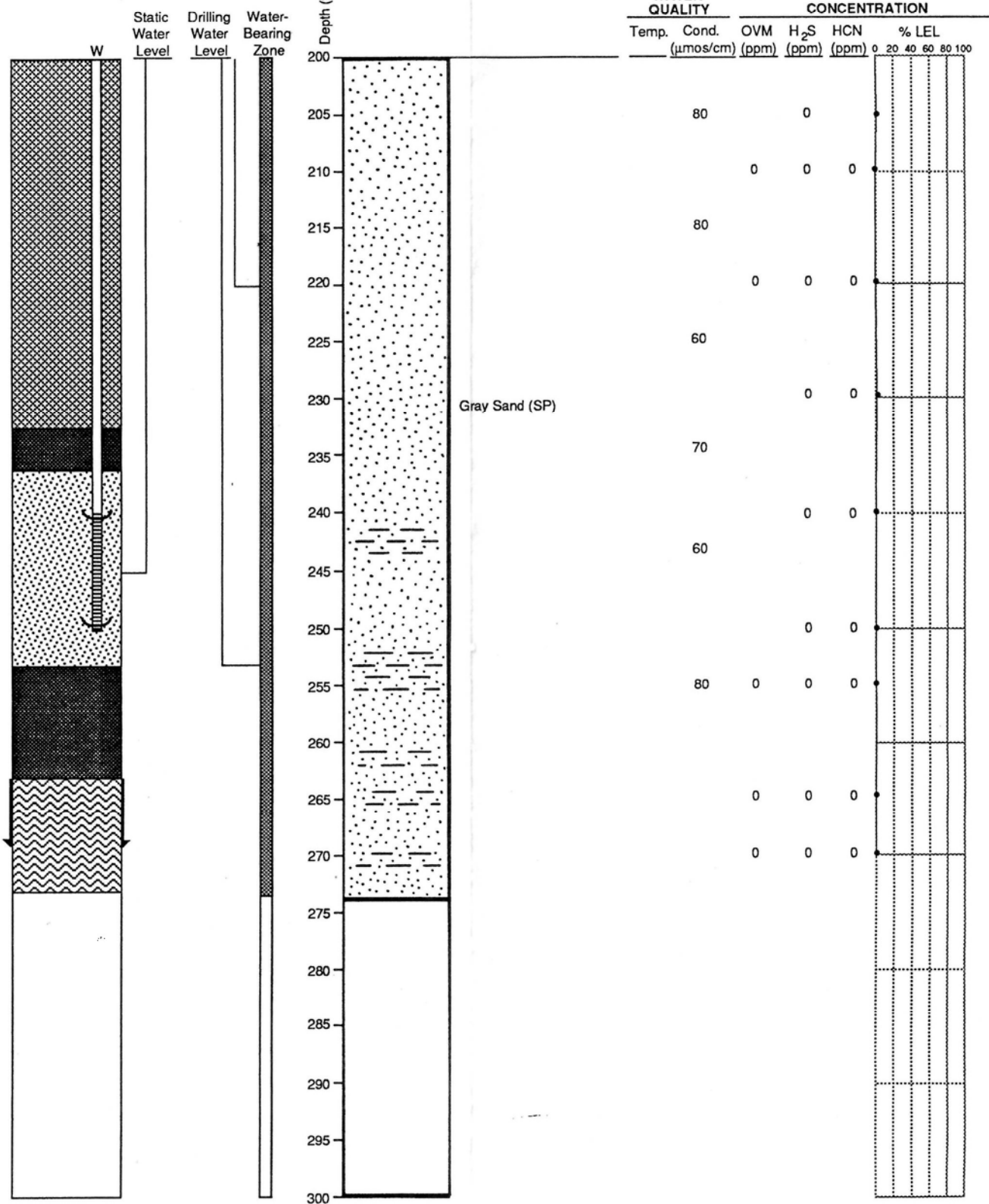


MONITOR WELL CONSTRUCTION DETAILS

GROUNDWATER OBSERVATIONS

GEOLOGIC LOG

FIELD MEASUREMENTS



Applied Geotechnology
Geotechnical Engineering
Geology & Hydrogeology

Summary Log of Monitor Well KMW-7
Kent Highlands Landfill RI/FS
Kent, Washington

PLATE

B2

JOB NUMBER
15,273.003

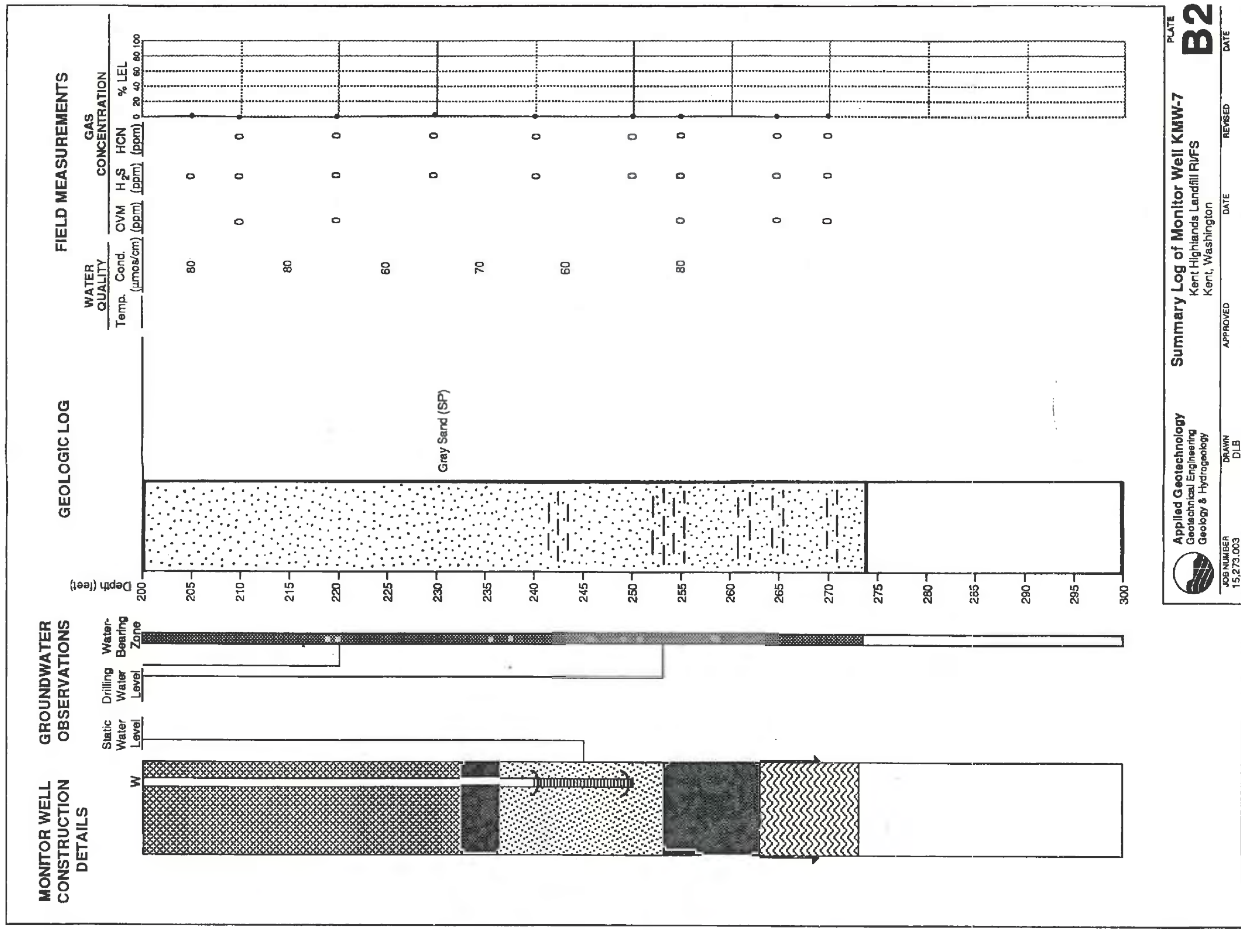
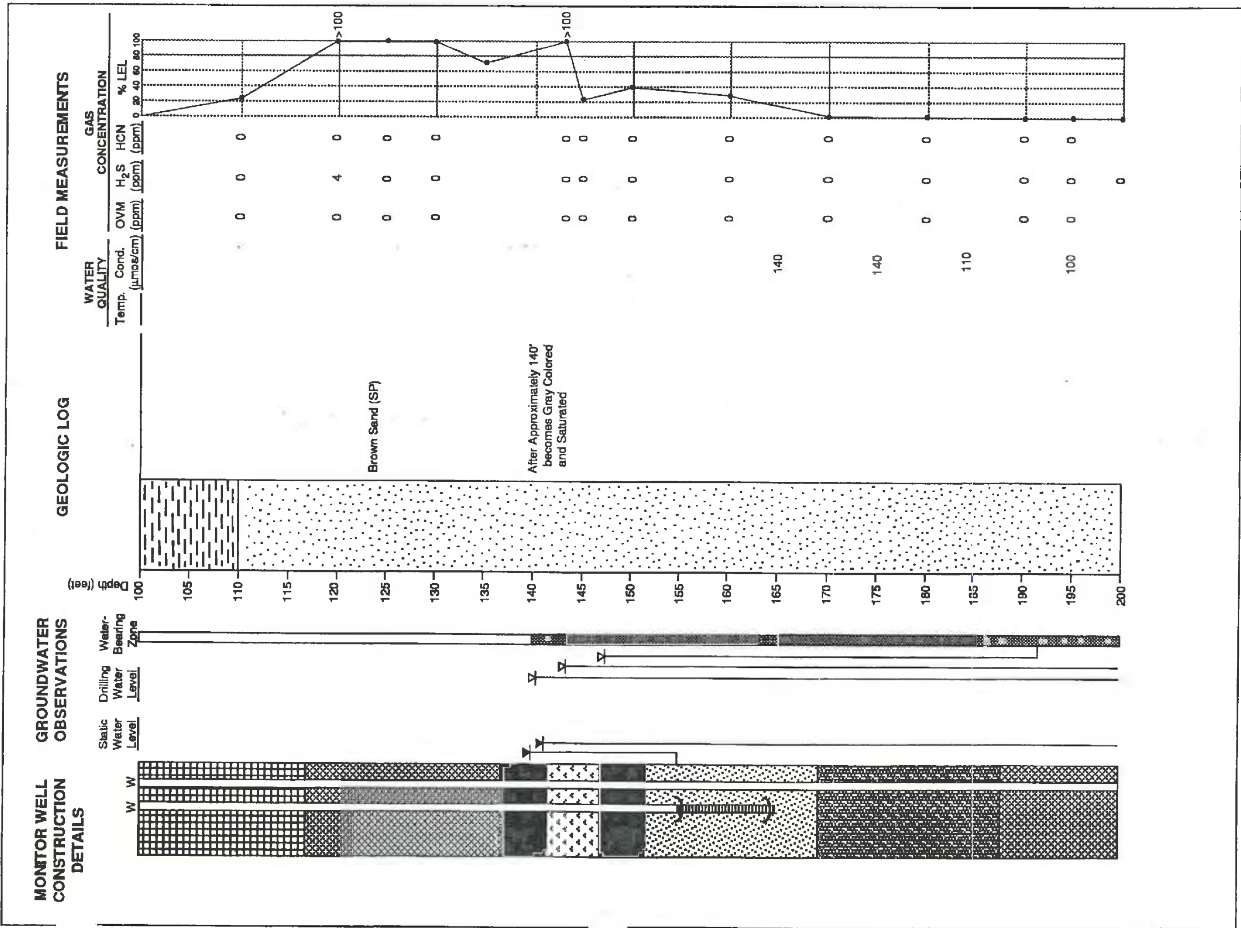
DRAWN
DLB

APPROVED

DATE

REVISED

DATE



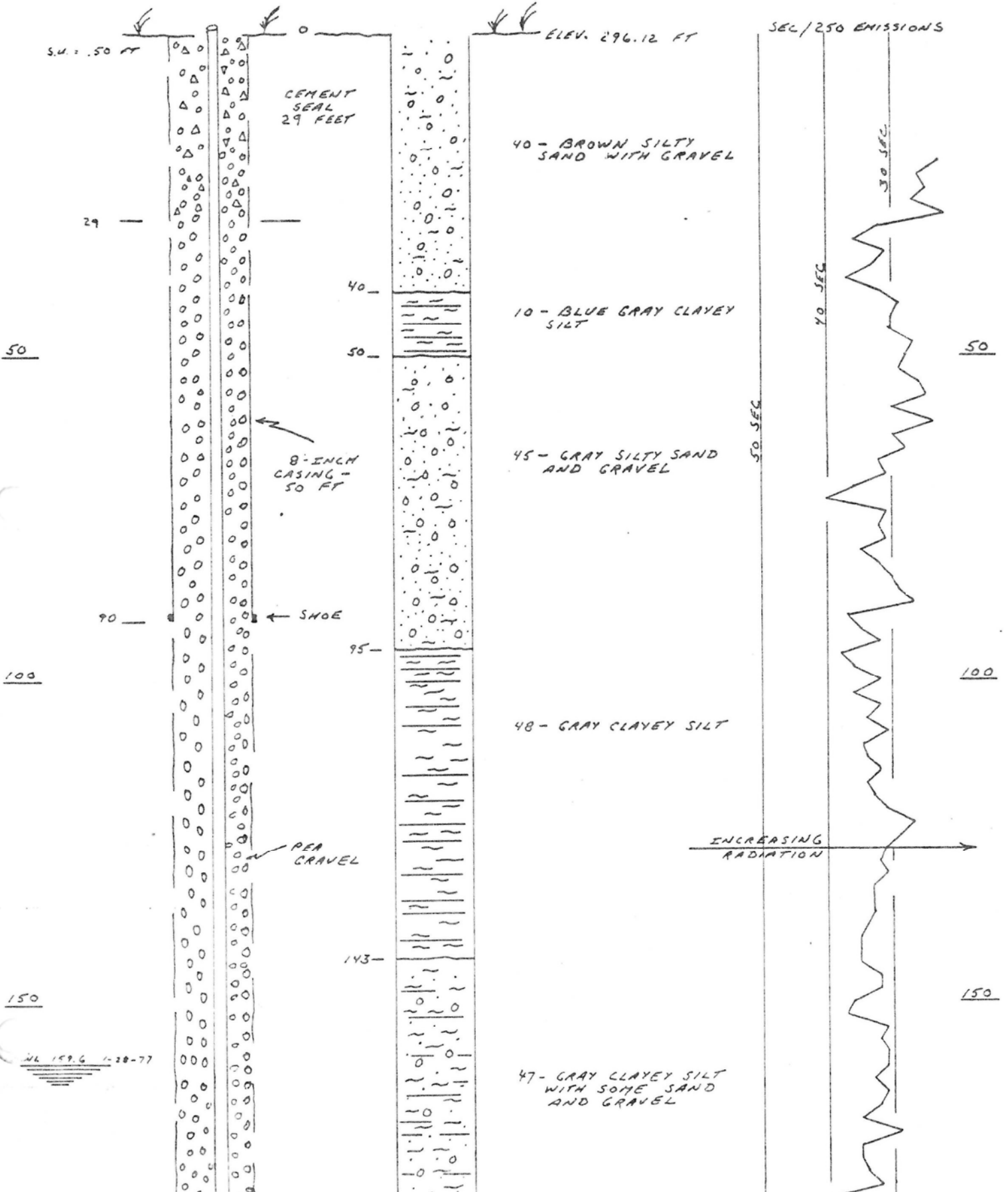
LOGS OF KENT HIGHLANDS PIEZOMETER NO. 1

FIGURE 2

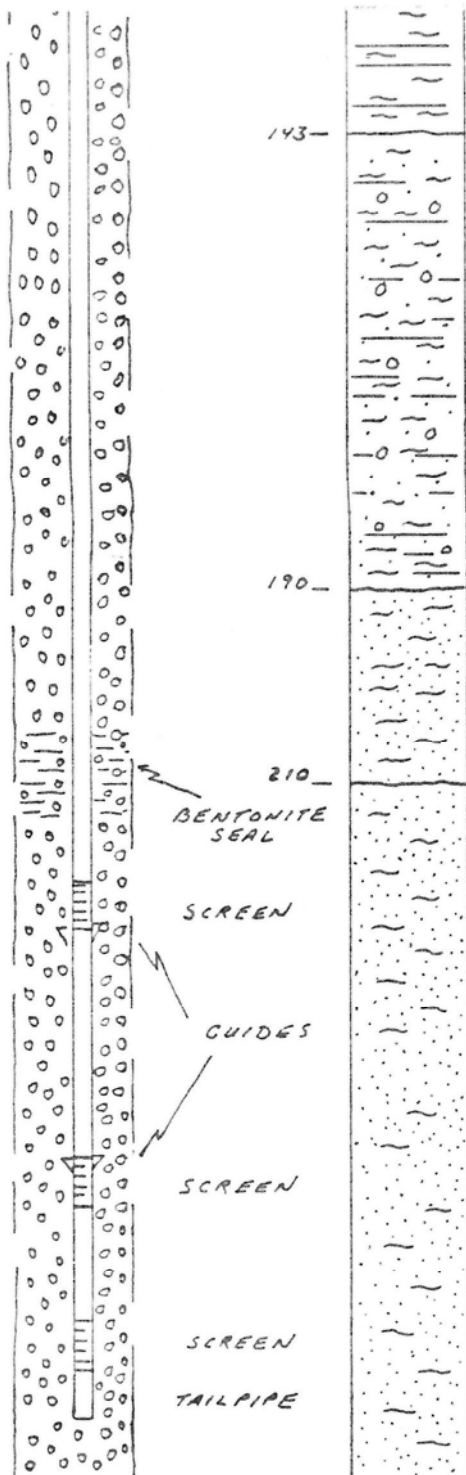
CONSTRUCTION DETAILS

GEOLOGIC LOG

GAMMA RAY LOG



SWL 159.6 1-28-77



47- GRAY CLAYEY SILT
WITH SOME SAND
AND GRAVEL

20- GRAY SILT WITH
FINE SAND
SOME WATER

71- GRAY SILTY SAND
WATER BEARING



BOTTOMED 281 FEET

ALL SCREEN IS MADE BY
JOHNSON UOP, GALVANIZED
STEEL, 12 SLOT, 2-INCH
DIAMETER, IN FIVE FOOT
SECTIONS THAT ARE THREADED
PIPE IS 2-INCH GALVANIZED
STEEL, THREADED AND COUPLED

NOTE: NOT DRAW TO
SCALE

CITY OF SEATTLE
SEATTLE, WASHINGTON

DRILLED BY
STORY AND ARMSTRONG DRILLING INC.
PUYALLUP, WASHINGTON

ROBINSON AND NOBLE INC.
GROUND WATER GEOLOGISTS
TACOMA, WASHINGTON

JAN 1977

DRAWN BY
DNA

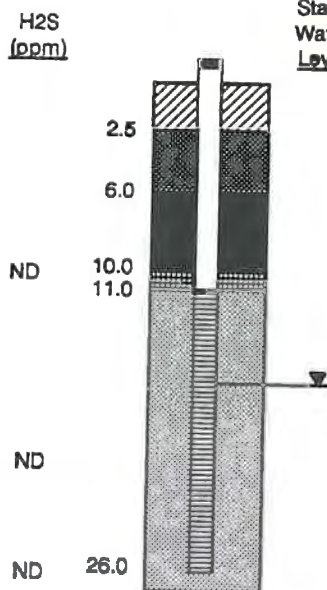
GAS CONCENTRATIONS (DURING DRILLING)

CONSTRUCTION DETAILS

GROUNDWATER OBSERVATIONS

Equipment Cyclone TH-60
Land Surface Elevation 299.7 Feet

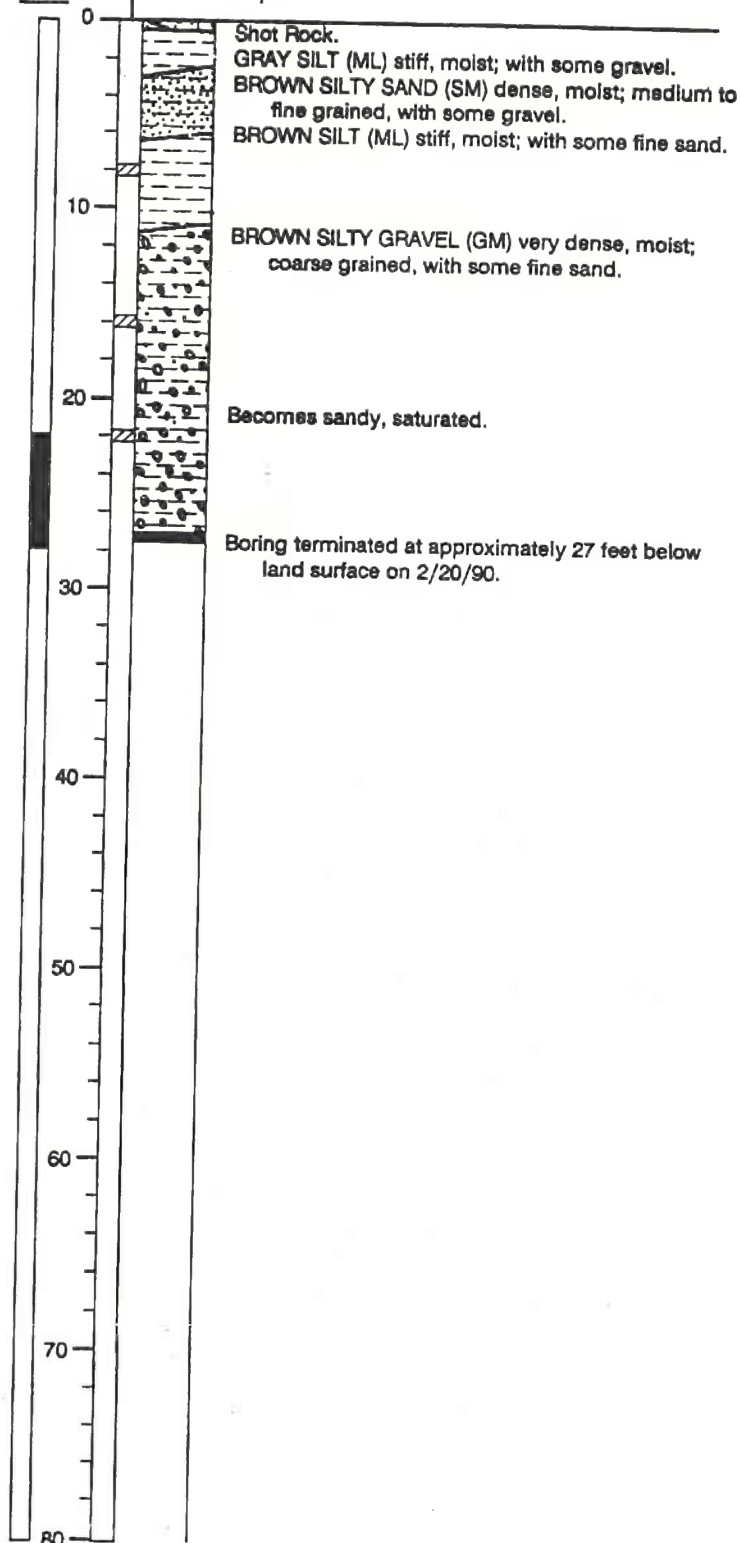
Date Completed 2/20/90



Static Water Level
Drilling Water Level
Water-Bearing Zone

Depth Sample

GEOLOGIC LOG



Applied Geotechnology Inc.
Geological Engineering
Geology & Hydrogeology

Log of Well KSGW-101
Kent Highlands Landfill Closure
Kent, Washington

FIGURE

W14

JOB NUMBER
15,273.011

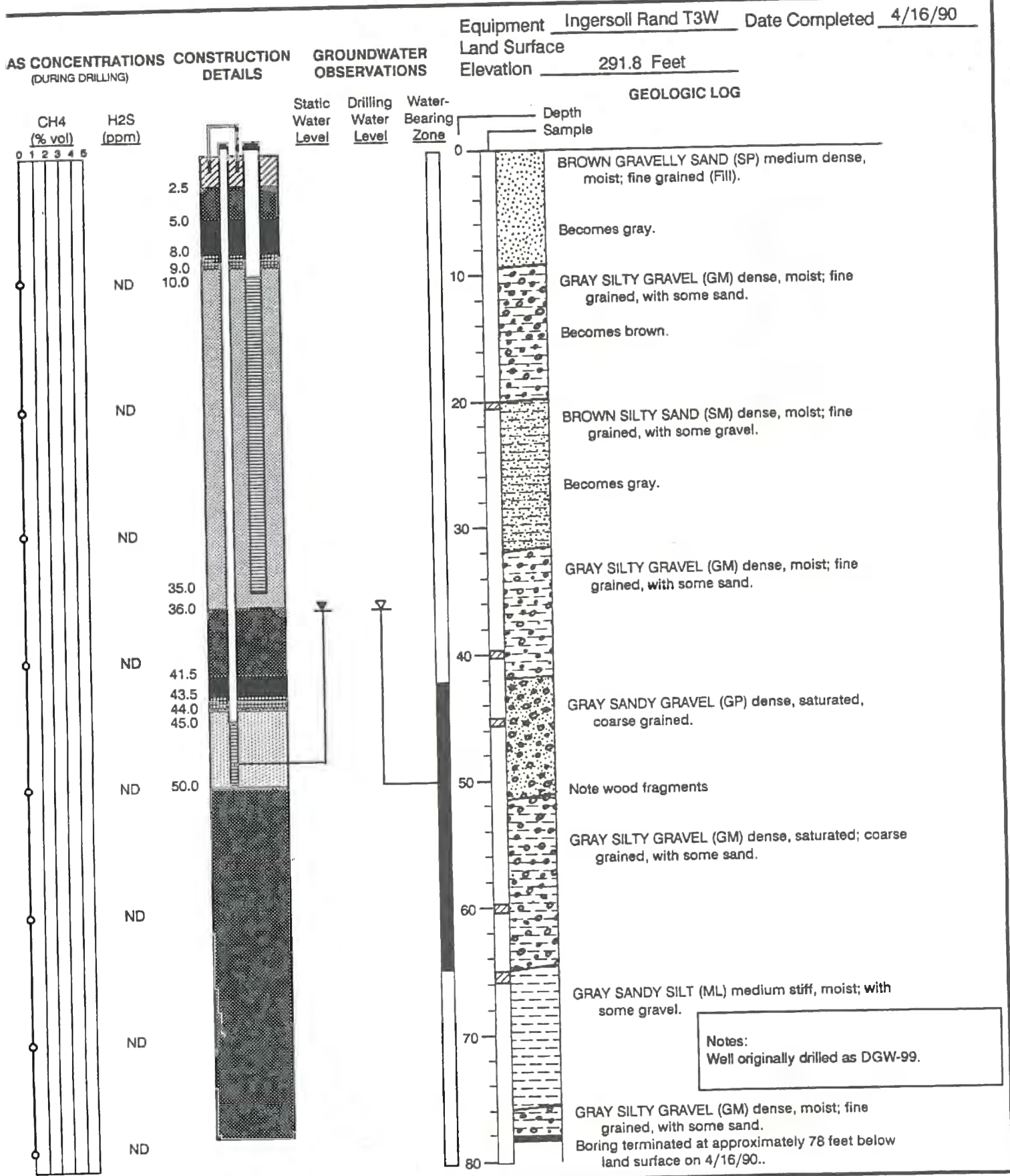
DRAWN
SES

APPROVED
APX

DATE
17 May 90

REVISED

DATE



Applied Geotechnology Inc.
Geological Engineering
Geology & Hydrogeology

Log of Well KSGW-99
Kent Highlands Landfill Closure
Kent, Washington

FIGURE

W11

Table C-6
Methane Gas Readings - Kent Highlands Landfill

Location	Date	Reading & Natural Gas (1)
PZ-2 Deep	1/28/82	0.5
Shallow	1/28/82	50
PZ-3 Deep	1/28/82	0.8
Shallow	1/28/82	0.0
PZ-5	1/28/82	0.0
PZ-4 Deep	1/28/82	0.0
TW 2	1/28/82	0.0
TH 4	1/28/82	0.0
TH 1	1/28/82	0.0
MW 1	1/28/82	0.0
MW 2	1/28/82	0.0
MW 3	1/28/82	0.0
MW 4	1/28/82	0.0
MW 5	1/28/82	0.0

(1) Measured with a Bacharach Model H gas tester without a downhole probe by Golder Associates.

Table C-7
Water Level Measurements - Kent Highlands Landfill

Well Number	Ground Surface Elevation (ft)	Depth to Open Interval (ft)	Readings (1) (Depth Below Ground Surface - ft)			
			1/27/82	3/5/82	3/8/82	4/8/82
MW-1a	43.6	18.0	2.1	2.9		
b		28.5	2.8	2.2		
c		39.3	1.6	1.9		
MW-2a	41.3	12.7	2.0	1.6		
b		26.5	1.8	2.0		
c		41.8	3.1	4.7		
MW-3a	40.5	17.0	6.4	4.3		
b		27.5	2.2	2.9		
c		42.0	2.5	6.5		
MW-4a	36.1	15.3	4.5	5.6		
b		24.5	4.75	9.1		
c		41.5	4.7	9.6		
MW-5a	36.6	18.0	6.4	10.9		
b		26.5	6.4	12.3		
c		40.0	6.15	12.4		
TW 2	274.0	210	142.0			142.0
TW 3	305.0	261				
PZ-2a	305.3	285	152.0			
b	305.3	123	108.0			
PZ-3a	299.3	239			103.3	
b	287.5	177			105.3	
PZ-4a	274.7	195	36.5			
PZ-5	270.6	196	46.0			
PZ-6	268.7	226				
TH-1	282.6	224.5	155.0			
TH-4	259.8	220.5	154.0			153.9
PT-3	278.0	288.0	B&D @ 136(2)			

- (1) All readings made using an electric well sounder.
(2) B&D = Blocked and Dry

Table C-8
Results of Topographic Survey
Performed by City of Seattle Engineering Department

Location	Coordinates		Ground Surface Elevation (ft)
	North	East	
MW-1	145,840	1,643,110	43.6
MW-2	145,690	1,643,120	41.3
MW-3	145,540	1,643,100	40.5
MW-4	145,615	1,643,260	36.1
MW-5	145,750	1,643,480	36.6
TW-2	146,912	1,642,022	259.8
TW-3	147,046	1,640,386	305.0
PZ-2 a & b	147,037	1,640,378	305.3
PZ-3 a & b	146,767	1,640,395	287.5
PZ-4	146,112	1,640,458	274.7
PZ-5	146,388	1,640,633	275.5
PZ-6	146,879	1,641,012	268.7
TH-1	147,010	1,641,498	282.9
TH-4	147,018	1,641,889	274.0
PT-3	147,005	1,641,403	278.0
Settlement Pond Below Tow Buttress			30.4
Treatment Pond			33.1
Unnamed Creek - South Side of Bridge			19.2
Green River at Inlet of Unnamed Creek			18.3